Vol. 128. No. 3 MARCH, 1928 Price 25 Cents

AMERICAN GAS JOURNAL

Established 1859 Pioneer of the Gas Industry

Including · GAS INDUSTRY · Est. 1900 ·

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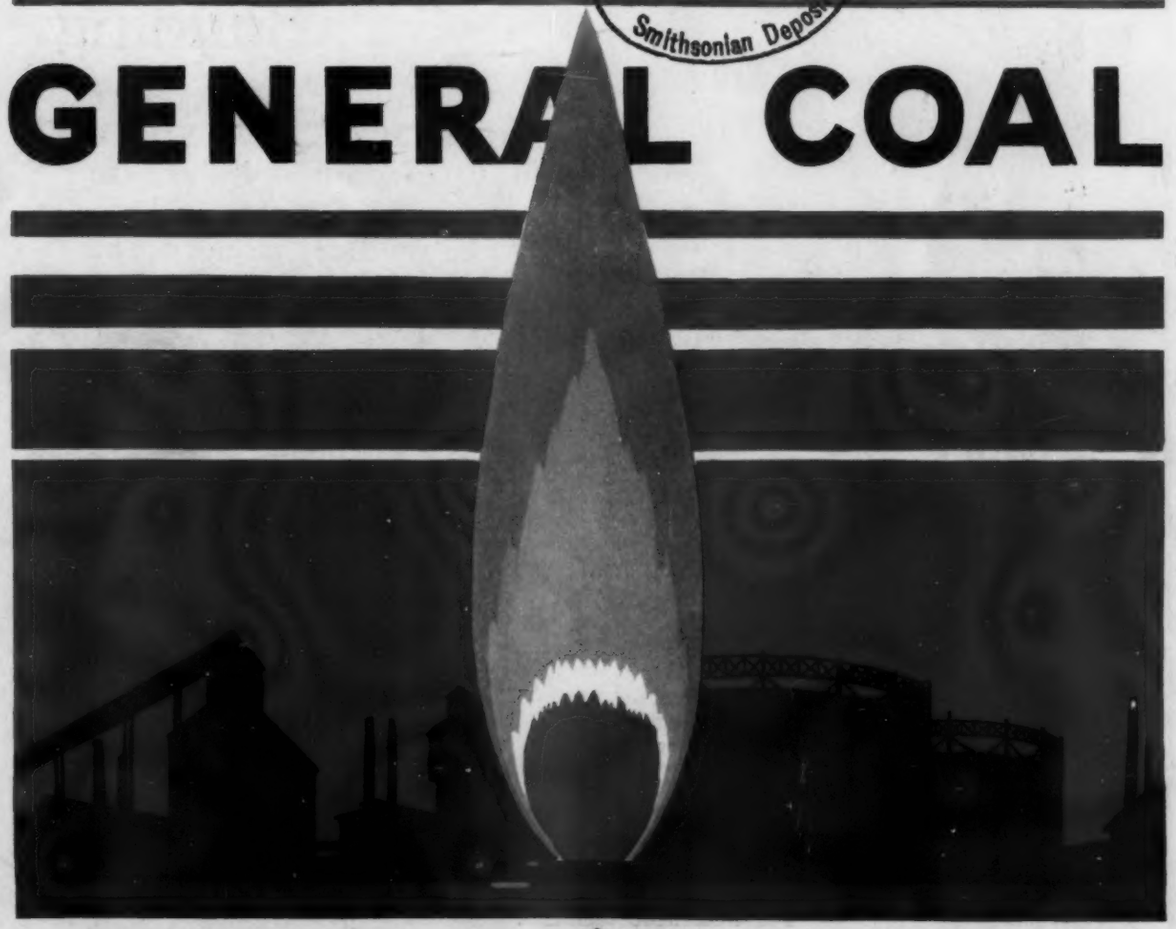
GENERAL COAL



RODA

Admiralty Coal

STONEGA

Boston, Mass.
Charleston, S. C.
Charlotte, N. C.
Cincinnati, Ohio

GENERAL COAL COMPANY
PHILADELPHIA, PENNA.

Detroit, Mich.
New York, N. Y.
Norfolk, Va.
Pittsburgh, Pa.

The New

Koppers Building

A THIRTY-TWO STORY building is being built for the Koppers Company in Pittsburgh. This structure will be the tallest office building in Pittsburgh and will be a splendid expression of modern design and efficiency.

The site of the building at Seventh avenue and Grant street is easily accessible to the Union Station, principal car and bus lines, the boulevards and the proposed new post office.

Architects are Graham, Anderson, Probst and White with E. P. Mellon as consulting architect.

Completion is promised for January, 1929. The Koppers Company will occupy the fourth to fifteenth floors and the balance of the building will be available for desirable tenants.

THE KOPPERS COMPANY

PITTSBURGH, PENNSYLVANIA

Chicago · New York

AMERICAN
GAS JOURNAL
Established 1859 *Pioneer of the Gas Industry*
Including GAS INDUSTRY Est. 1900

Published Monthly by American Gas Light Journal, Inc., 53 Park Place, New York, N. Y.

S. G. KRAKE, *President and Treasurer* H. M. RILEY, *Editor* A. M. GLEASON, *Secretary*

R. S. McBRIDE, *Consulting Editor*—Washington, D. C.

Vol. 128. No. 3 **March. 1928** **Whole Number 3651**

TABLE OF CONTENTS

Editorial 23

Serving Both Gas and Steel Plants With Modern Ovens—By R. S. McBride... 27

Coke Oven Accidents..... 32

Turning Over the Turnover Problem—By F. B. Streyckmans..... 34

Keeping the Wheels Turning—By Don C. Murphy 38

An Important Legal Point—By W. F. Schaphorst 41

Heat Transfer in Condensers—By W. K. Lewis 42

The Heat Required for Coal Distillation—By L. Litinsky..... 44

Association Activities 49

Sales Theme Features New England Meeting 50

Technical and General Miscellany for the Busy Gas Man..... 52

Matlack's Merchandising Memoranda... 59

Educational Window Display Advertising—By Ray Martin..... 62

Woman's Clubs Federation Boosts Gas.. 63

Operating a Research Kitchen—By Dorothy E. Shank..... 64

The Salesroom Beautiful..... 66

Fundamental Studies of Industrial Gas Utilization—By Alfred H. White..... 70

Equipment News 72

Happenings of Former Days..... 74

News of the Gas Industry..... 76

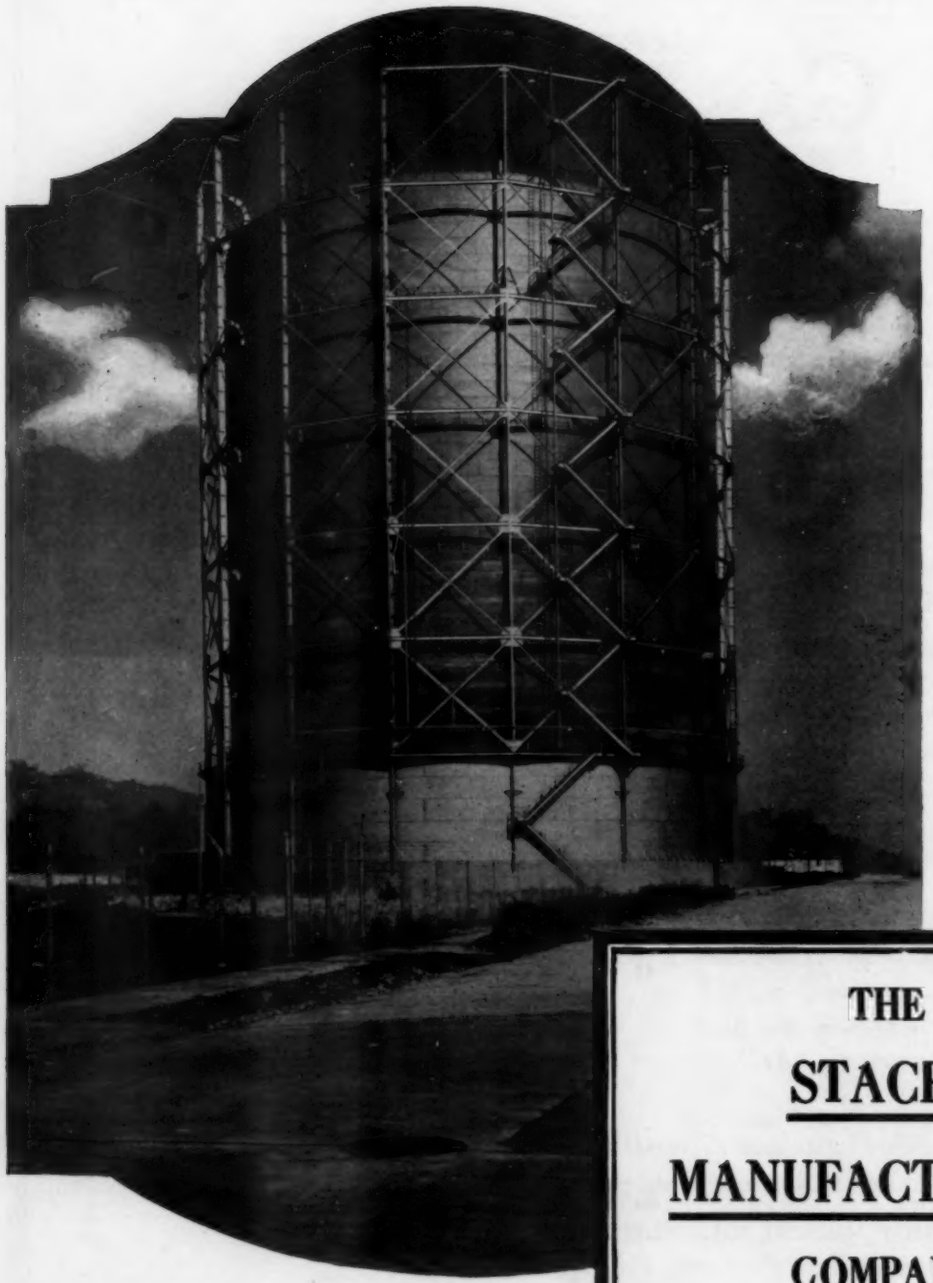
Personals 80

Trade News 82

AMERICAN GAS JOURNAL, March, 1928. Vol. 128. No. 3. Published Monthly by American Gas Light Journal, Inc., New York, N. Y. Entered as second-class matter, January 1, 1917, at the post-office of New York, N. Y., under the Act of March 3, 1879.

Subscription $2.00 per year, including postage, in the United States, Mexico, Cuba, Porto Rico, Hawaii or the Philippines; in Canada $3.00; foreign $4.00. Single copies 25 cents.

INDEX TO ADVERTISERS, PAGE 123



3,000,000 *Cu. Ft. 5 Lift Gas Holder*
Built for
The Nassau & Suffolk Lighting Co.,
Long Beach, Long Island

77 Years of Service to the Gas Industry

THE

STACEY

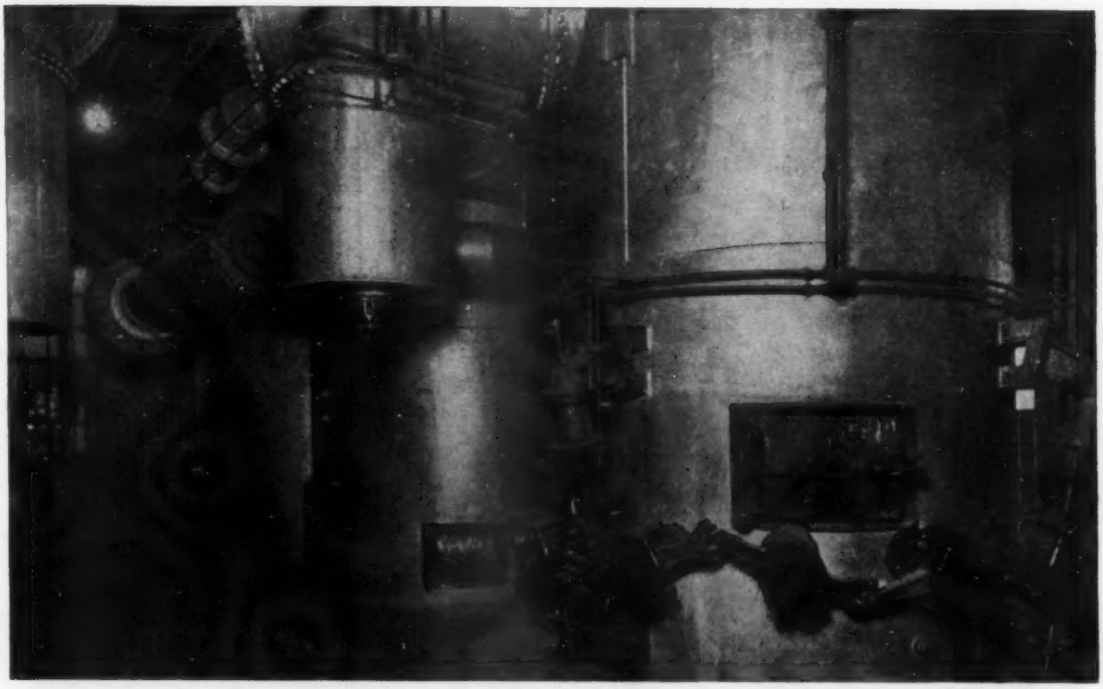
MANUFACTURING

COMPANY

CINCINNATI, OHIO

NEW YORK OFFICE
52 Vanderbilt Ave.

13 Days to Erect Steere Water Gas Machine with *Rolling Grates*



Patent applied for

Clinker floor view of 10′ Steere Water Gas Machine, erected in 13 days.

December 26, 1927—We began clearing foundations for a 10′ x 10′ x 10′ Steere Water Gas Machine, equipped with hydraulic poker and ***Steere Rolling Grates,*** for the Illinois Power Company at Springfield.

December 31, 1927—Erection work was started.

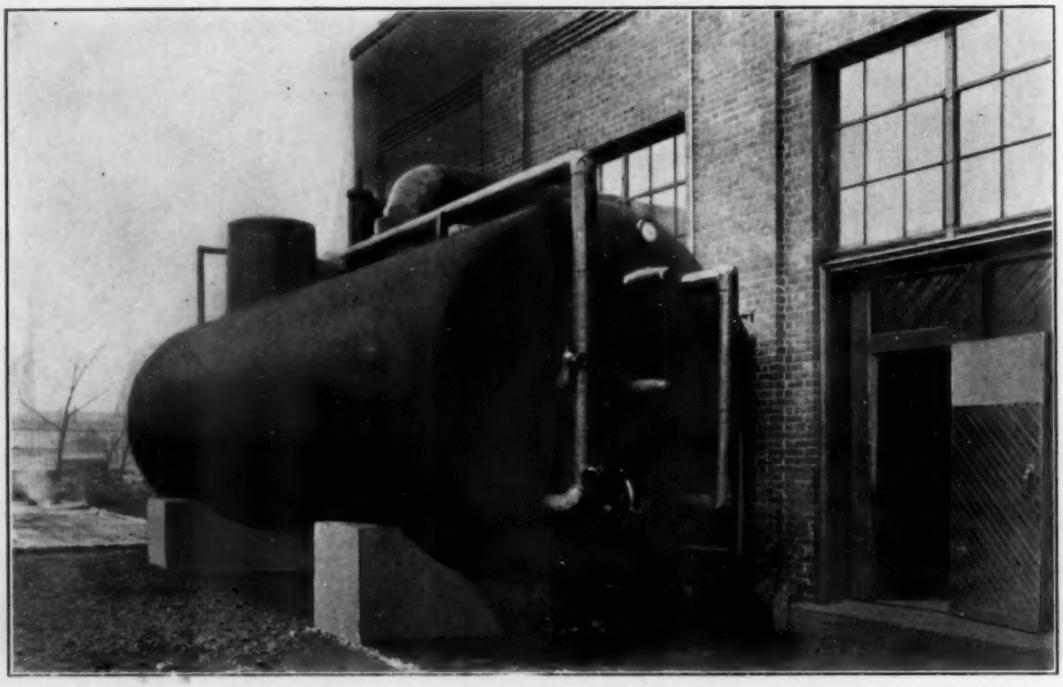
January 12, 1928—Erection work was completed. Actual erection time was 13 days.

Steere Water Gas Machines have upset all traditional standards for capacity and performance.

If you need anything in a hurry we can give it to you.

SEMET-SOLVAY
ENGINEERING CORPORATION
Division Allied Chemical and Dye Corp.
40 RECTOR ST. NEW YORK

SMOOT STEAM ACCUMULATOR



Hudson Valley Coke & Products Co., Troy, N. Y., installation of 9 ft x 30 ft. Smoot Steam Accumulator, Semet-Solvay Engineering Corp., Engineers.

SMOOT STEAM ACCUMULATORS ARE INSTALLED IN MANY OF THE LARGEST WATER GAS PLANTS

The following large water gas plants of recent construction are equipped with SMOOT STEAM ACCUMULATORS and SMOOT CONTROL of COMBUSTION:—

Atmospheric Nitrogen Corp., Hopewell, Va.
Semet-Solvay Engineering Corp., Engineers.

The Brooklyn Union Gas Company—Greenpoint Works, Brooklyn, N. Y.
The Bartlett Hayward Company, Engineers.

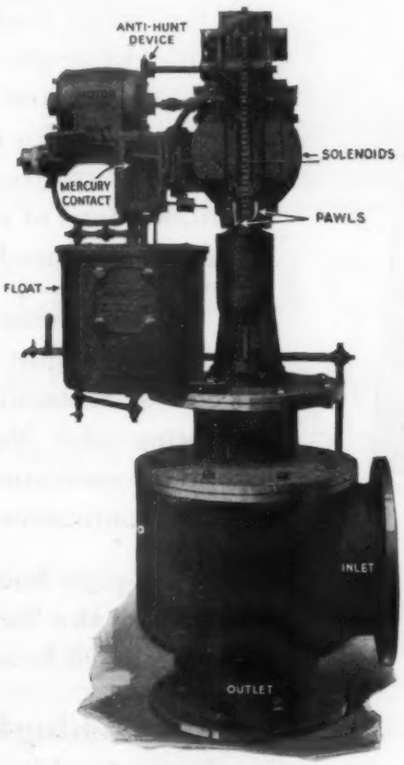
Public Service Electric & Gas Company—Harrison Gas Plant, Harrison, N. J.
Public Service Production Company, Engineers.

SMOOT ENGINEERING CORPORATION
136 Liberty Street New York

SMOOT CONTROL

Power Driven
PRESSURE REGULATORS

For Controlling Suction on Gas Retorts and Ovens



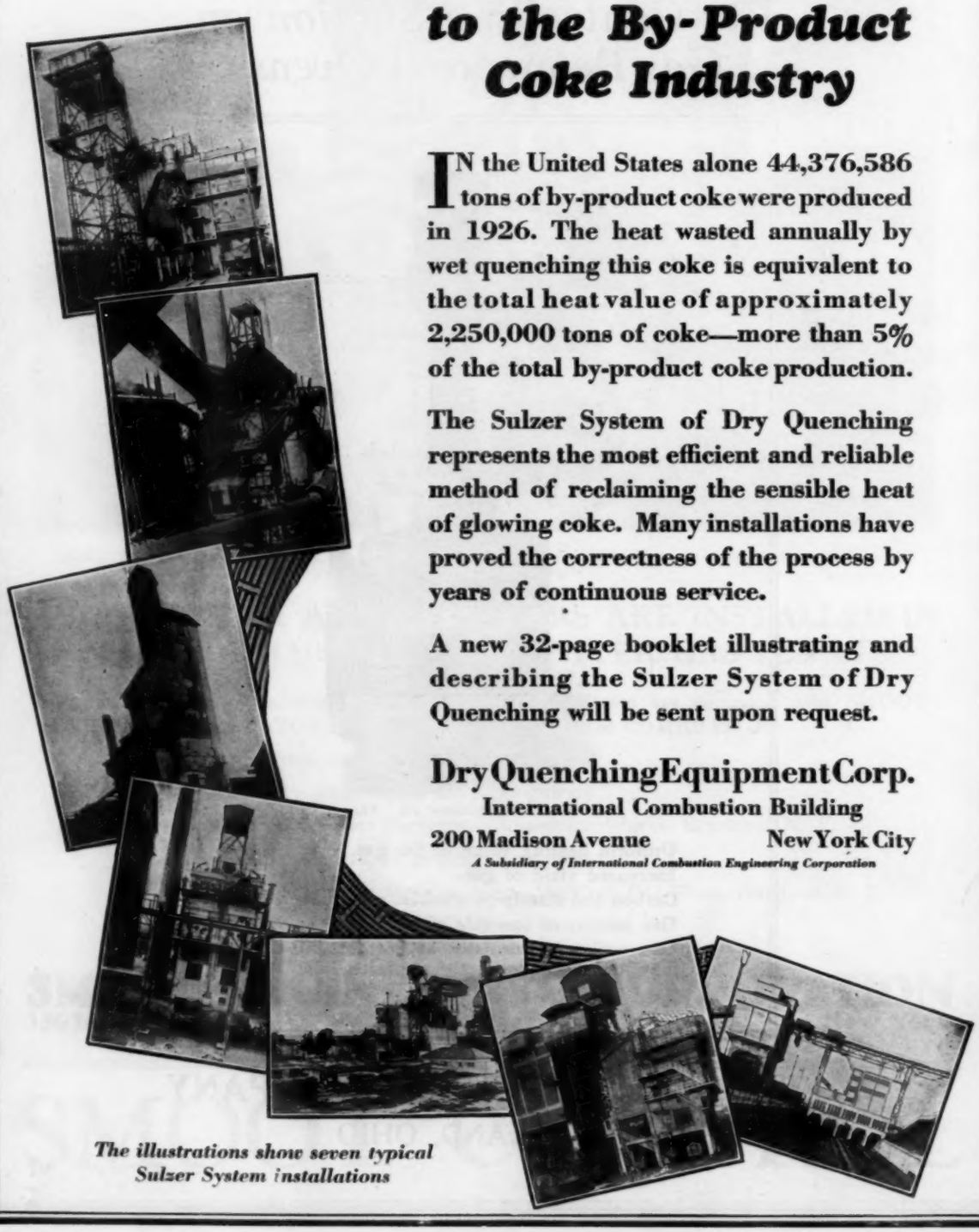
THE GAS MACHINERY CO. *813

Uniform heating value of the gas.
Increased yield of gas.
Carbon and standpipe troubles minimized
Gas inlet is at one side of body.
Gas outlet is normally at bottom, but may be placed directly opposite inlet.

THE GAS MACHINERY COMPANY
CLEVELAND, OHIO

Dry Quenching

—an Economic Necessity to the By-Product Coke Industry



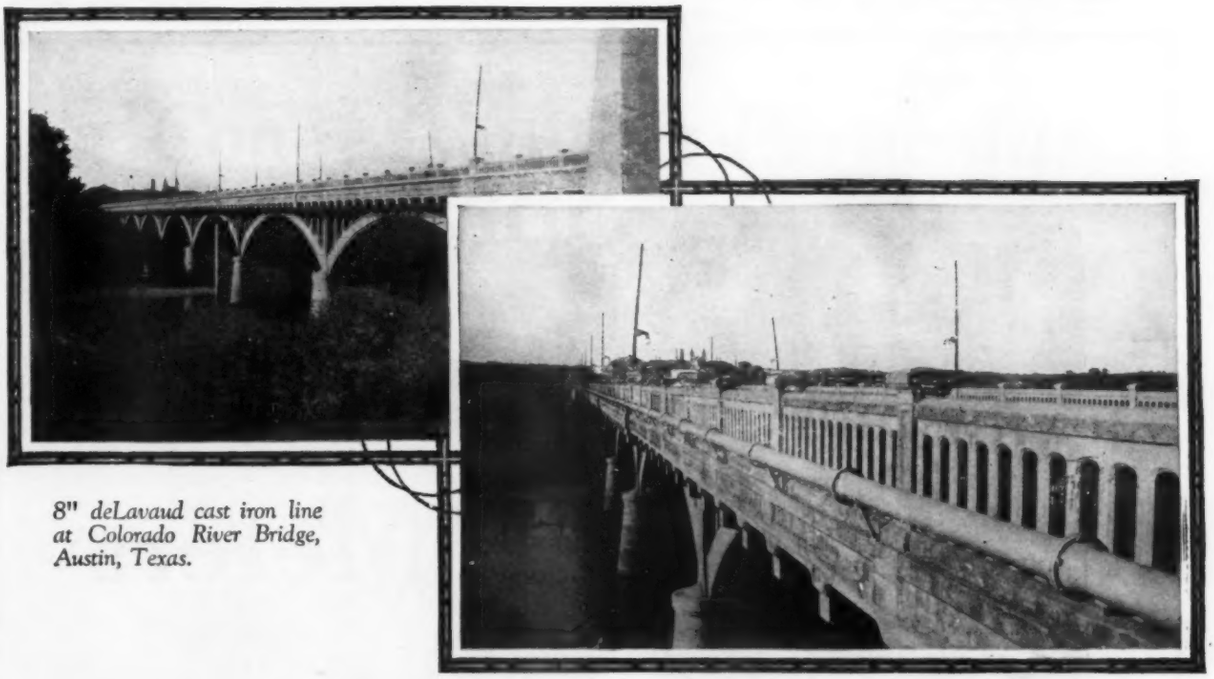
IN the United States alone 44,376,586 tons of by-product coke were produced in 1926. The heat wasted annually by wet quenching this coke is equivalent to the total heat value of approximately 2,250,000 tons of coke—more than 5% of the total by-product coke production.

The Sulzer System of Dry Quenching represents the most efficient and reliable method of reclaiming the sensible heat of glowing coke. Many installations have proved the correctness of the process by years of continuous service.

A new 32-page booklet illustrating and describing the Sulzer System of Dry Quenching will be sent upon request.

Dry Quenching Equipment Corp.
International Combustion Building
200 Madison Avenue New York City
A Subsidiary of International Combustion Engineering Corporation

The illustrations show seven typical Sulzer System installations



8" *deLavaud cast iron line at Colorado River Bridge, Austin, Texas.*

deLavaud Centrifugal Cast Iron Pipe with Anthony Joints makes a *permanently* tight line

SUCH installations as illustrated here are subject to unusual strains and constant vibration. The great tensile strength of deLavaud pipe and the flexibility of the Anthony Joint eliminates the possibility of these strains causing leakage.

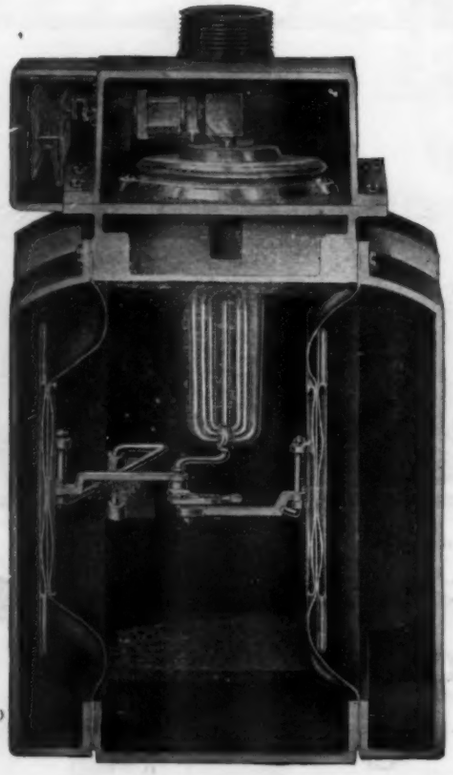
Municipal, industrial or construction engineers should write for literature covering specifications, manufacture and use of deLavaud pipe for high pressure mains.

United States Cast Iron Pipe and Foundry Company

General Offices:
Burlington, New Jersey

SALES OFFICES

Philadelphia: 1421 Chestnut St.
Chicago: 122 So. Michigan Blvd.
Birmingham: 1st Ave. & 20th St.
Buffalo: 957 East Ferry Street
Cleveland: 1150 East 26th Street
New York: 71 Broadway
San Francisco: 3rd & Market Sts.
Pittsburgh: 6th & Smithfield Sts.
Dallas: Akard & Commerce Sts.
Kansas City: 13th & Locust Sts.
Minneapolis: 6th St. & Hennepin Ave.



Sprague Standard Meters

for
accurate
pilot light
measurement

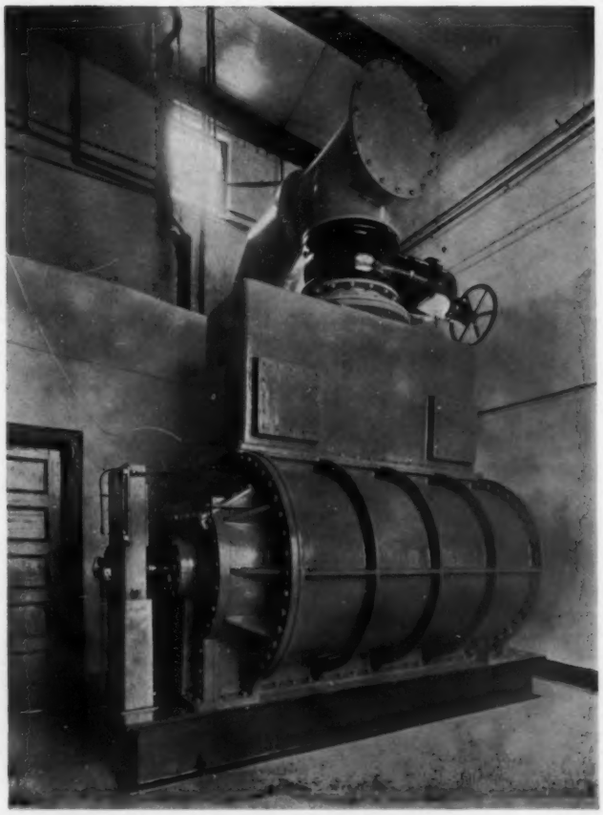
Sprague Standard Meters represent over twenty years of progress

Write for Bulletin No. 10

Sprague Meter Company

Bridgeport **Conn.**

Coney Island is Particular



Coney Island, New York, usually gets full value for its money, whether from the pleasure for which it is noted, or the business of gas making. Hence the installation of the Connersville Rotary Displacement Meter, shown here, in the Coney Island plant of the Brooklyn Borough Gas Co.

This Connersville Meter is a 28 in. x 84 in. type with a capacity of 700,000 cubic feet per hour. The accuracy with which it performs its duty and the low operating and maintenance costs have convinced this company that they are receiving full value for the money expended.

Users everywhere are generally of the same opinion, as is evidenced by the many repeat orders. Learn more of this dependable accuracy in gas measurement by asking for Bulletin 4C, or consult our nearest office.

THE CONNERSVILLE BLOWER COMPANY

12th Street and Columbia Avenue, Connersville, Indiana

623 Monadnock Block, Chicago
604 Chamber of Commerce Bldg., Pittsburgh
Eastern Service Co., Boston
114 Liberty St., New York

CONNERSVILLE

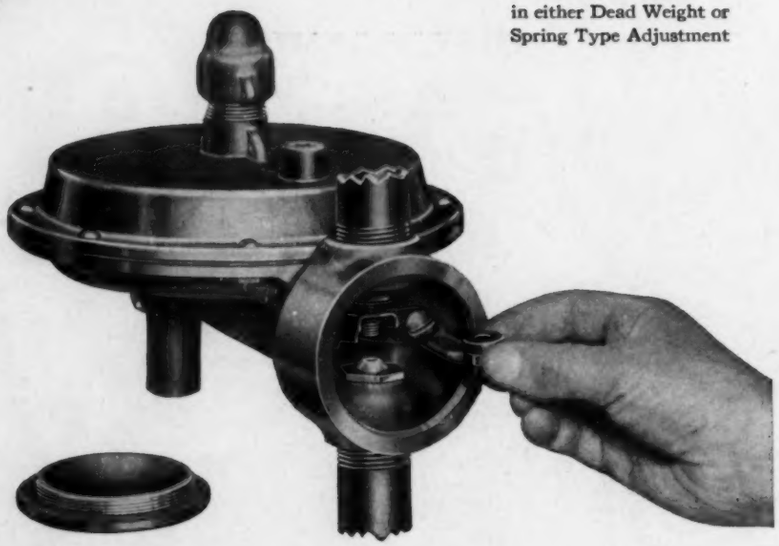
Blowers • Gas Pumps • Meters • Cycloidal Pumps

RECOGNIZED LEADERSHIP IN

MODEL 10 SERIES

For service in the PIPE LINE

MODEL 10 SERIES
with or without
Mercury Seal
in either Dead Weight or
Spring Type Adjustment



All working parts accessible and interchangeable while in pipe line!

YOU can save many hours of productive labor; speed up installation time; cut installation costs and realize new and better performance with the Reynolds *Model 10* Series. Every working part in the Model 10 may be removed while in the pipe line and every working part is so accurately made that it is always interchangeable.

Reynolds Products are built to enable you to render your customers the greatest possible trouble-proof service. It will pay you to investigate the possibilitics of making Reynolds equipment standard throughout your system.

Representatives:
EASTERN SERVICE COMPANY, BOSTON, MASS.
F. E. NEWBERRY, AVON, NEW JERSEY
THOS. C. CORIN, DETROIT, MICHIGAN

Reynolds Products

for all kinds of Pressure Reduction—for either artificial or natural gas.

Governors—
Intermediate Pressure
Triple Outlet
Holder
Toggle Type Street

Regulators—
High Pressure Service
Low Pressure Service
Intermediate Pressure
High Pressure Line
Single and Double
District Station

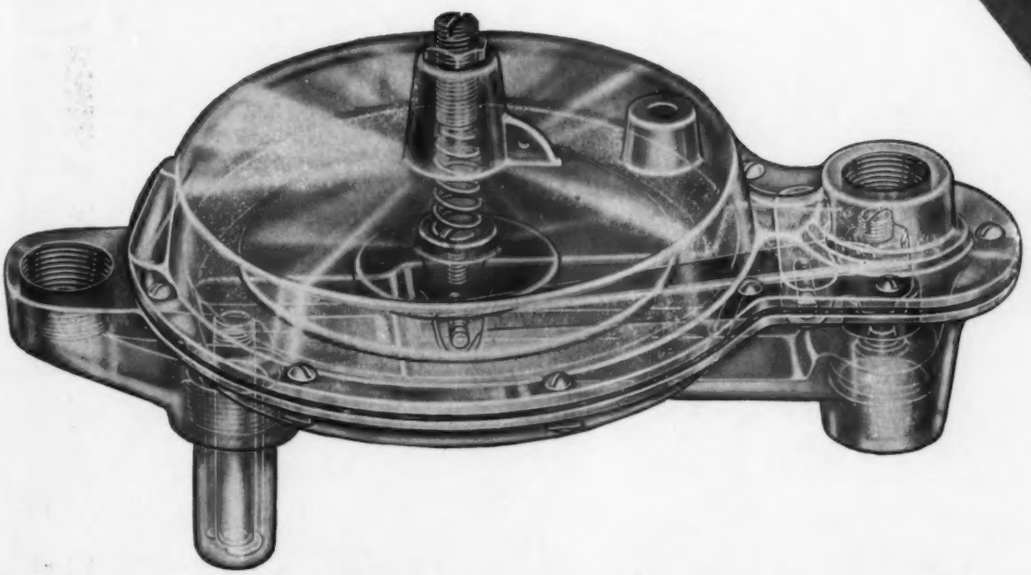
Valve—
Automatic Quick-Closing
Anti-Vacuum

COMPANY MEMBER OF AMERICAN GAS ASSOCIATION

GAS CONTROL SINCE 1892

MODEL 20 SERIES For service at the PLANT

MODEL 20 SERIES
with or without
Mercury Seal
in either Dead Weight or
Spring Type Adjustment



Working parts so accurate as to permit complete interchangeability in shop . . . also assuring perfect relationship of valve to orifice

MODEL 20 Series—a companion Governor to the Model 10 Series—was designed to increase efficiency of the plant that services all equipment in the shop. *Model 20* Series is the result of constant experiment and thorough testing during the past two years. Increased efficiency in operation—all working parts so accurate that they are completely interchangeable*—means small service stocks. All working parts are rust-proof, reducing need of attention. Engineers will appreciate the accurate, efficient Reynolds *Model 20* Series—the cost will interest purchasing agents and customers will be satisfied. Complete data on Reynolds Service Governors on request.

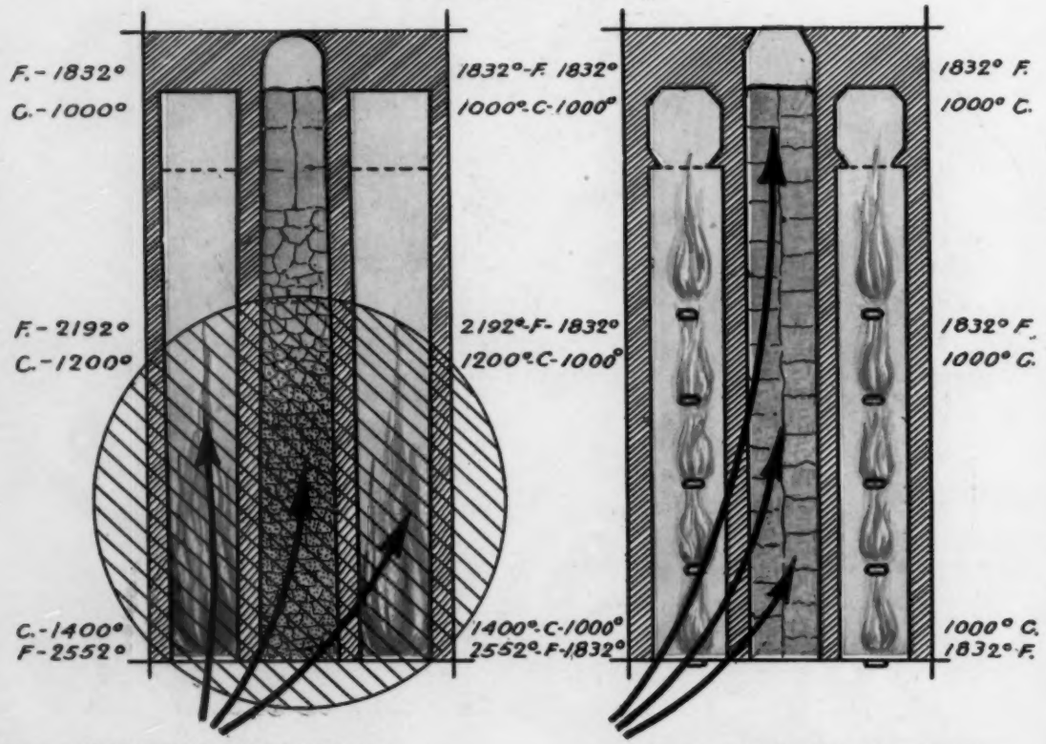
*Ordinary repair parts for Series 20 are interchangeable with parts for the old-type service governor. We will continue to supply plants desiring old-type service governor.

Reynolds
Gas Regulator Company
Anderson, Indiana
Established 1892

THE PROOF!

Showing the Efficiency of the STILL SYSTEM of MULTI-STAGE COMBUSTION

The demonstration plant, as indicated below, has been in operation for the past six months and is 19 feet 8 inches high



THE COMMON ONE-FLAME METHOD

Note how combustion is practically limited to lower 5′ to 6′ 6″, and only occasional tips of flame reach 7′ 6″.

—and then—

THE CARL STILL MULTI-STAGE COMBUSTION SYSTEM

Note how in the Still System the heating gas is stretched over the entire height of the heating flue—19′ 8″.

Furthermore—A 40% throttling of the volume of heating gas did not in the least affect the uniformity of the Still System, while the one-flame process was confined to parts in the immediate vicinity of the sole of the flue.

Other strong points of the Still System are:
Excessive Heating eliminated. Utmost protection of Distillation Gases. Highest yield in By-products, and Free Flowing Tar. Fastest operation of ovens and largest possible thruput. Lowest consumption of fuel gas. Unlimited oven height. Maximum safety and minimum labor requirements in operation. Greatest efficiency.

Let our Consulting Engineers give further details

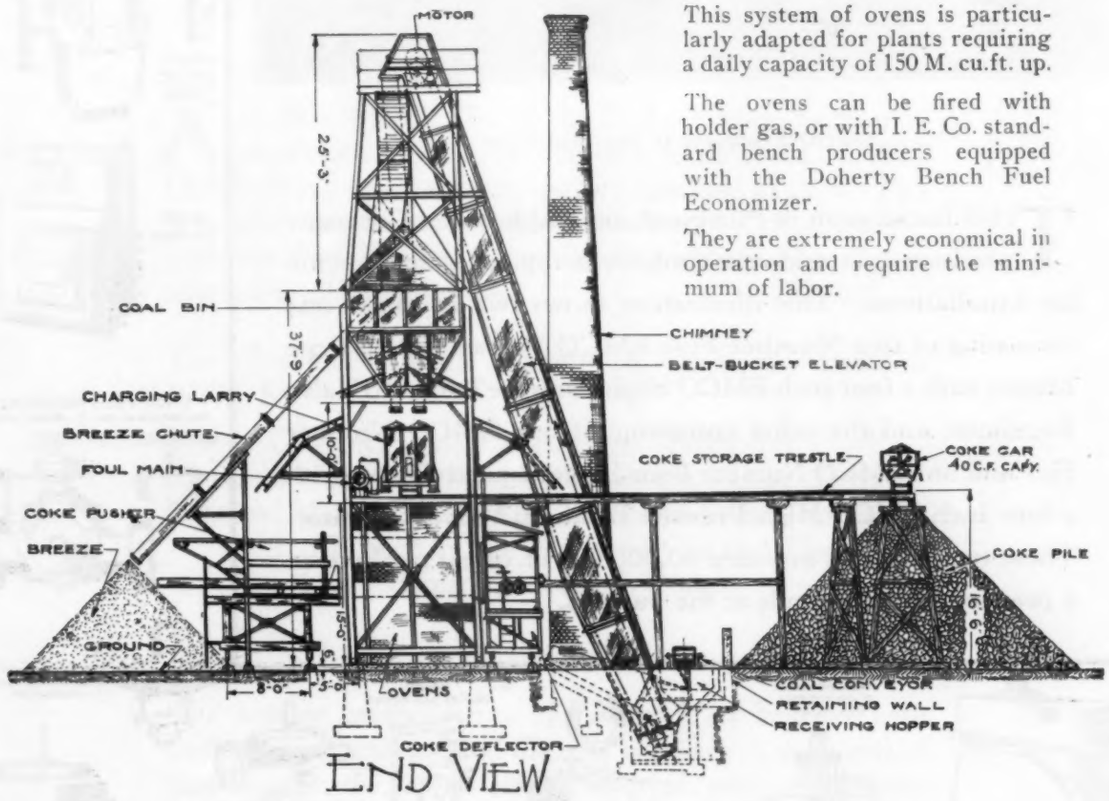
CARL STILL CORPORATION

114 LIBERTY STREET, NEW YORK

The UNIT TYPE

HORIZONTAL GAS *and* COKE OVENS

Developed primarily to meet the requirements of the small and medium size gas plants



END VIEW

This system of ovens is particularly adapted for plants requiring a daily capacity of 150 M. cu.ft. up.

The ovens can be fired with holder gas, or with I. E. Co. standard bench producers equipped with the Doherty Bench Fuel Economizer.

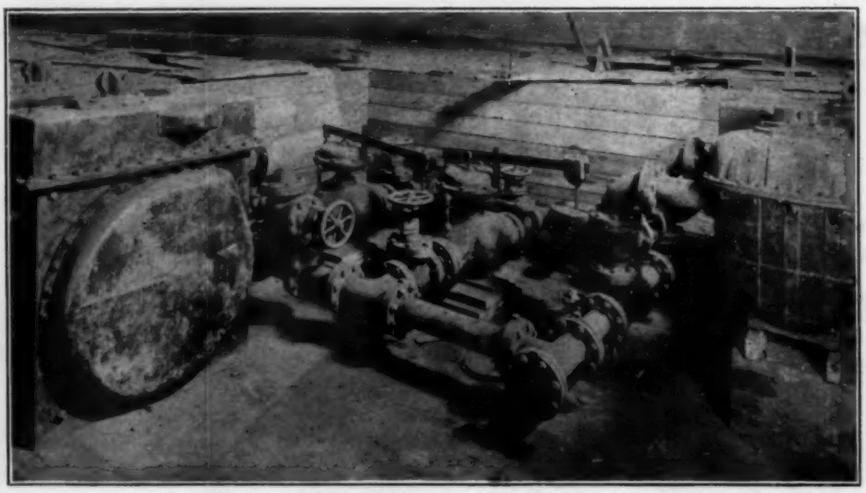
They are extremely economical in operation and require the minimum of labor.

This model, which reflects the achievements of our "Improved" HORIZONTAL GAS OVENS under a new form, is described in detail in a special bulletin sent on request.

Write us for full information regarding plant of this type now operating

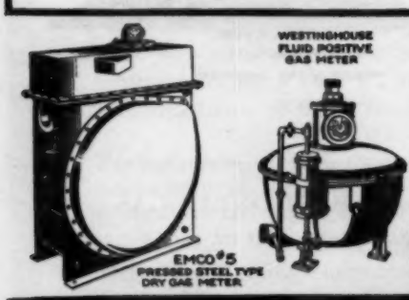
THE IMPROVED EQUIPMENT COMPANY

24 STATE STREET *Engineers-Builders* **NEW YORK CITY**



EMCO Products in the Mid-West

THIS installation of Pittsburgh Equitable Meter Company products in a mid-west foundry is typical of many similar installations. This illustration shows two batteries, one consisting of two Number Five EMCO Pressed Steel Type Meters with a four inch EMCO High Pressure Balanced Valve Regulator, and the other consisting of one EMCO Number Five and one EMCO Number Four Large Capacity Meter with a four inch EMCO High Pressure Balanced Valve Regulator. These two batteries measure 50,000 Cu. Ft. of gas per hour at a pressure of ten pounds at the burners.



PITTSBURGH EQUITABLE METER COMPANY

MAIN OFFICE AND WORKS PITTSBURGH, PA.

NEW YORK CHICAGO COLUMBIA, S.C. LOS ANGELES DALLAS
TULSA SEATTLE KANSAS CITY SALT LAKE CITY

GLOVER-WEST *Vertical Retorts*

A
28 DAY TEST

A SUBCOMMITTEE of the Carbonization Section of the American Gas Association completed for the 1927 Convention a series of plant tests inaugurated in 1926. Full particulars can be seen in the Carbonization Committee reports for these two years, and should be studied by all contemplating plant extensions.

The Glover-West plant at Stamford, Conn., was tested in 1927. See:

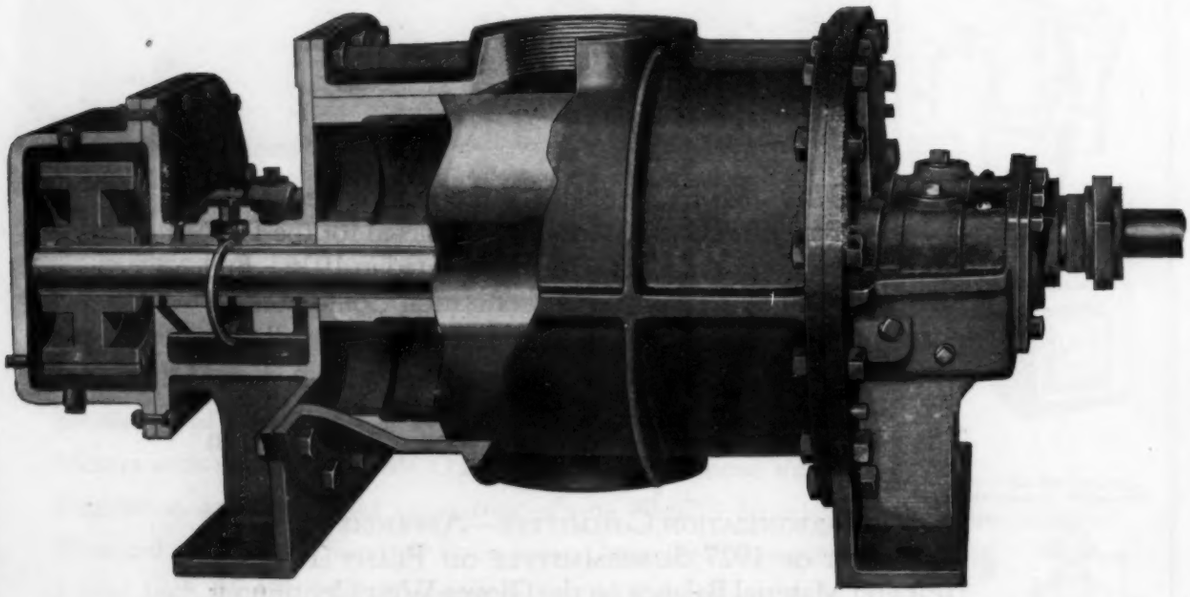
CARBONIZATION COMMITTEE—APPENDIX 1
REPORT OF 1927 SUBCOMMITTEE ON PLANT TESTS
Heat and Material Balance on the Glover-West Continuous Vertical Retorts of the Stamford Gas and Electric Company, Stamford, Conn.

The heating arrangements of Glover-West benches with their control facilities, and the ease with which the speed of coal through the retorts can be adjusted, enables operators to get the maximum yields possible from any coal used, without disturbing labor time schedules or sacrificing efficient fuel results.

WEST GAS IMPROVEMENT CO.
Builders of Coal Gas Plants
441 Lexington Ave. New York.

ROOTS

Roots Acme Gas Pump for Industrial Services



Roots Acme Construction—

Look at Roots sturdy construction!

Extra wide faced, oversize gears securely locked on shafts operate in totally enclosed, oil-tight, dirt-proof, one-piece housing.

Accurately milled and carefully balanced impellers are finished over entire external surface.

Exceptionally long, interchangeable, one-piece, wear-resisting, protected bronze bearings with loose ring oiling and grooves are finished all over to standard dimensions.

One-piece, properly ribbed, bored and finished close-grained grey iron case carries inlet and outlet connection cast integral for extreme simplicity and rigidity.

Only one heavy duty stuffing box is required, as bearings are positively sealed.

Complete information in our Bulletin 31-B-2.

We also manufacture Roots Gas Meters, Blowers, Liquid Pumps, Vacuum Pumps and Accessories.

The P. H. & F. M. ROOTS CO.

CHICAGO
Peoples Gas Building

CONNERSVILLE, INDIANA

NEW YORK
120 Liberty Street

Originators of the Double Impeller Rotary Principle

ADAMANT DISTRIBUTORS

Alabama, Birmingham,
Young & Vann Supply Co.
California, Los Angeles
Industrial Supply Co.
California, San Francisco,
W. E. Mushet Co.
Colorado, Denver,
H. W. Thompson
Connecticut, Hartford,
Factory Supply Co.
Connecticut, New Britain,
Rackliffe Bros. Co., Inc.
Connecticut, New Haven,
The Warner-Miller Co.
Illinois, Chicago,
Wm. E. Dee Co.
Indiana, Fort Wayne,
Coan Equipment Co.
Indiana, Indianapolis,
Indianapolis Belting & Supply Co.
Iowa, Des Moines,
Waltedh Supply Co.
Kentucky, Louisville,
E. D. Morton & Co., Inc.
Kentucky, Paducah,
Henry A. Petter Supply Co.
Louisiana, New Orleans,
Woodward, Wight & Co., Ltd.
Louisiana, Shreveport,
Woodward, Wight & Co., Ltd.
Maryland, Baltimore,
Codd Tank & Specialty Co.
Massachusetts, Boston,
Waldo Bros. & Bond Co.
Massachusetts, Springfield,
Oscar F. Carlson
Massachusetts, Worcester,
Waldo Bros. & Bond Co.
Michigan, Detroit,
H. D. Edwards & Co.
Minnesota, Duluth,
Duluth Builders Supply Co.
Minnesota, Minneapolis,
Northern Machinery & Supply Co.
Missouri, Kansas City,
Union Material & Supply Co.
Missouri, St. Louis,
Handlan-Buck Mfg. Co.
Nebraska, Omaha,
American Machinery & Supply Co.
New York, Buffalo,
The Curtis Supply Co.
New York, Mohawk,
American Hard Wall Plaster Co.
New York, New York,
C. C. Phillips, 110 W. 34th St.
New York, Rochester,
American Clay & Cement Corp.
Wm. Summerhays & Son
New York, Rome,
American Hard Wall Plaster Co.
New York, Syracuse,
Paragon Plaster Co.
New York, Utica,
American Hard Wall Plaster Co.
North Carolina, Asheville,
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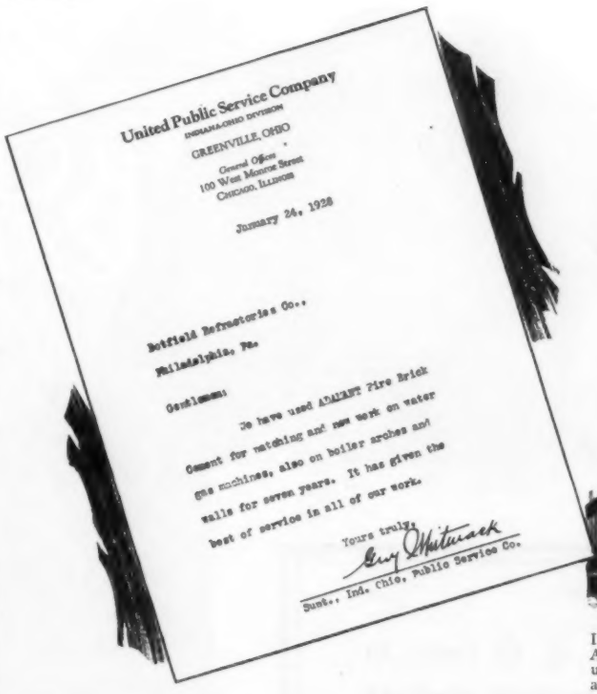
Ohio, Cincinnati,
Wm. T. Johnston Co.
Ohio, Cleveland,
Cleveland Tool & Supply Co.
Ohio, Columbus,
Westwater Supply Co.
Ohio, Dayton,
Klinger-Dills Co.
Ohio, Toledo,
Toledo Builders Supply Co.
Oklahoma, Tulsa,
Standard Asbestos & Cork Co.
Oregon, Portland,
M. L. Kline Co.
Pennsylvania, Bethlehem,
Morris Black
Pennsylvania, Erie,
O. C. Thayer & Son
Pennsylvania, Pittsburgh,
Pittsburgh Supply Co.
Pennsylvania, Reading,
Reading Foundry & Supply Co.
Rhode Island, Providence,
B. & H. Supply Co.
South Carolina, Columbia
Columbia Supply Co.
South Carolina, Spartanburg
Spartanburg Mill Supply Co.
Tennessee, Memphis,
Reed & Duecker
Texas, Beaumont,
Norvell-Wilder Hardware Co.
Texas, Corpus Christi,
San Antonio Machine & Supply Co.
Texas, Dallas,
The Murray Co.
Texas, El Paso,
Geo. S. Thomson Co.
Texas, Houston,
Norvell-Wilder Hardware Co.
Texas, San Antonio,
San Antonio Machine & Supply Co.
Texas, Waco,
San Antonio Machine & Supply Co
Virginia, Norfolk,
Empire Machinery & Supply Corp.
Virginia, Richmond,
Southern Ry. Supply Co.
Washington, Seattle,
Cragin & Co.
Washington, Spokane,
Consolidated Supply Co.
West Virginia, Charleston,
South Side Foundry & Machine Works
Wisconsin, Milwaukee,
W. H. Pipkorn Co.
Wisconsin, Superior,
The Speakes Company

Canadian Distributors

British Columbia, Vancouver,
B. C. Equipment Co., Ltd.
Manitoba, Winnipeg,
Walter Belyea & Co., Ltd.
Ontario, Hamilton,
Thomson-Gordon, Ltd.
Ontario, Port Arthur,
Wells & Emmerson
Ontario, Toronto,
J. H. Morrison
Quebec, Montreal,
Alex. Brenner, Ltd.


United Public Service Company
INDIANA-OHIO DIVISION
GREENVILLE, OHIO
General Offices
100 West Monroe Street
CHICAGO, ILLINOIS

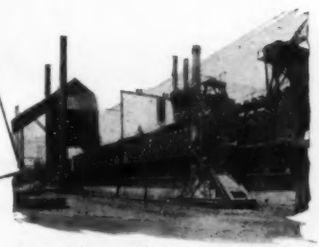
January 24, 1928

Botfield Refractories Co.,
Philadelphia, Pa.

Gentlemen:

We have used ADAMANT Fire Brick Cement for patching and new work on water gas machines, also on boiler arches and walls for seven years. It has given the best of service in all of our work.

Yours truly,
Guy Whitmack
Supt., Ind. Ohio. Public Service Co.



In another mid-western gas plant ADAMANT Fire Brick Cement is used for spraying coke oven jams, and as a refractory surfacing for coke oven walls. Coke oven operators prefer ADAMANT because it is easily handled, and is exceptionally resistant to brick-destroying actions.

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Gas Holders

View of Main Plant, Located at Baltimore

AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry
Including GAS INDUSTRY Est. 1900

HENRY M. RILEY, *Editor*

Salesmen's Compensation

THE PROPER compensation for salesmen is a subject that is being given careful consideration by a large number of gas merchandising managers and executives. Further, it is fairly obvious that the salesman of ten years ago is not entirely of the type and caliber to successfully carry on in this present day of vigorous competition.

Some while back we heard a gas appliance salesman declare, with considerable gusto and pride, that he was being paid at the rate of about two hundred dollars a month by his company, the latter operating in a city of considerably more than a hundred thousand in population. Incidentally, in the same community, it is more or less common knowledge that a large jobber of automobile accessories, many of which are sold from a none too ornate catalog, will not keep a salesman who cannot earn for himself a minimum of four thousand dollars per annum.

WHAT IS the answer to such a state of affairs which, by the way, can be illustrated with numerous examples from many other lines of business activity? There can be but one, assuming the salesman is a forward looking individual; he receives his training from the local gas company, is taught the rudiments of salesmanship, and then goes elsewhere to "cash in." And candor compels the statement that we must admire him for being a better salesman than we imagined. He knows where to sell his goods—his ability—to the end that he will be able to fetch the highest price for them.

THIS IS not a very palatable condition when one considers that the gas company offers its salesmen a great many advantages that do not readily obtain in other organizations. In this reward he is surer of a job in later life than is the case in many other businesses; his hours are more regular; he is seldom away from home; he has available the various company social advantages.

JUST WHAT rate of pay should apply to gas company salesmen depends upon local conditions within the company and the cost of living in the particular community. Most vital, it depends upon the competition offered by other businesses. As indicated, it is human nature for the salesman to heed the call of the highest bidder for his services. If he is of the type that will stick, it is a moot question as to whether he should be retained by the gas company at all.

Hence, it would seem that the gas merchandising manager should study salesman salary competition in his community and endeavor to meet it. In some cases this might mean an increase in the cost of appliances or the lopping off of some incompetent salesmen and giving the good ones a larger field. At all events, this competition must be met or we will have to be satisfied to hobble along to our own detriment.

What Is the Gas Industry?

CITY gas supply is today based upon a much broader and more complicated foundation than ever before. In many cases the public-utility gas man manufactures no gas. He buys his required supply from a separate manufacturing corporation, from a nearby coke oven plant, or from a natural-gas producing or pipe line company. As a consequence, the interest of the city public-utility gas executive has broadened greatly. He must take account of the ups and downs in the metallurgical industry in order to know the probable effect on his business through increased or decreased coke-oven gas supplies. He must keep in touch with pipe-line developments, both those for intercompany connection and interurban transmission and those connecting great municipal areas with natural-gas supplies in distant fields.

In the City of Boston there is one of the most interesting examples of the interlocking of city-gas business with other industry. There the distributing company is affiliated with a large corporate group which has splendid interlocking facilities for handling of fuel all the way from the mine to the customer's meter. The coal comes from company mines, is handled in company vessels through a company fuel yard, processed in a modern oven plant, which incidentally serves both gas and coke needs of the city as well as coke needs of affiliated iron works. There is in such a situation industrial romance. One sees how men with large vision have efficiently coordinated the various aspects of fuel supply for a great city. And they have gone farther than this. They have, for maximum efficiency, tied in the whole fuel supply system with a metallurgical group and with other related industry.

The Boston development also has great interest for the engineer because in that plant there is one of the most interesting developments in coke-oven construction. This plant has an important new method for the charging of coke ovens which was developed by the engineers of that company and incorporated in the designs of the latest form of Wilputte coke oven. The operating results appear to more than justify the radical construction of the ovens. That plant, which is described in detail by an extended staff article in this issue, is also illustrative of many other novel developments that give promise of contributing their share to the betterment of gas-making practice and that are worthy of careful study by all.

Executives and engineers connected with a natural-gas branch of the industry are also affording us striking examples of the complexity of the city-gas business today. In order to stabilize that branch of the industry and to provide for most economical city supply, natural gas is being used either as a supplement to or with the supplement of manufactured gas in a constantly increasing number of communities. It is a short-sighted executive in the natural-gas branch who is not closely watching developments in manufactured gas, for he can little know how soon he too will have to operate a producing plant making gas from coal or oil, as well as operating the field production and transmission systems. The interweaving of the industrial trends affecting coal gas, water gas, natural gas, coke-oven gas, and even the distant cousin, producer gas, is constantly more evident and constantly more important to all divisions of the business. There is almost an identity of interest in all matters of public relations, distribution, merchandising, industrial-gas sales, and general management. There is coming to be almost as nearly an identity of interest in the basic problem of production.

A "Chemist" May Be a Real Extravagance

A FEW years ago in our presence one of the most prominent gas engineers remarked: "I do not believe in chemists for gas works." While the shock of this remark was still fresh in our mind we met the chief chemist employed by the concern in which this engineer was an important executive. Then we understood his statement. The individual who filled the position of chemist in his organization had as his major qualification for the job the relationship of cousin to one of the vice-presidents. His acquaintance with chemistry was, at best, casual, and his usefulness to the company perhaps less than nothing.

Perhaps other executives have had the same experience in their laboratories. Often, in fact, it is observed that the so-called chemist is nothing more than a routine analyst of coal and oil and gas. He may have had a year of college chemistry or he may be simply a "practical" man.

Such a man traveling under the title of chemist is certainly an extravagance for most works. The man who is needed is one who has the foundation of a thorough knowledge of physics, chemistry and engineering. He understands, at least in a general way, the principal laws of nature which govern the processing of fuels in the works and the delivery and

use of the gas. He can often anticipate trouble and not simply make analyses afterwards as an aid to post-mortem autopsies on disastrous failures of equipment or supplies.

But such a man cannot be hired for the price of a high school graduate. He ranks professionally with engineers equally trained and must be compensated accordingly. Furthermore, these men must be given the incentive and the opportunity to advance themselves in the business. A chemical investigator successful as the laboratory director may, indeed, be the ideal new assistant superintendent; and from that point up there is no limit set, except by the ability of the individual, upon either advancement of the man or value to the employer. The cheap so-called "chemist," on the other hand, is undoubtedly an extravagance.

Thermal Calculations

THERE are many qualifications which the gas plant superintendent must measure up to in order to be able to store gas in the holder at a minimum cost. Of these the ability to properly conduct a test on the gas making apparatus and intelligently figure out and interpret the observed data is of major importance.

Cut-and-try methods have no place in our present day scheme of manufacturing gas; we must operate our water gas sets and coal gas apparatus with an intimate knowledge of what is going on in them during the process of making gas. In this connection, if the need should arise, the plant superintendent or engineer should be sufficiently competent to plan and direct an experimental run on his equipment and, what is more important, to finally calculate and set down a heat balance.

In former times the usual garden variety of gas plant operators had not so much as the barest acquaintance with such terms as endothermic and exothermic reactions, heats of formation and the like. And to have suggested that such operators figure out a balance sheet on the thermal performance of their gas making apparatus would have been a waste of breath, to say the least.

Those colleges and universities which are specializing in gas engineering should see to it that the ready ability to handle the thermal calculations incident to the making of gas is possessed by every candidate for graduation.

Puncturing an Old Theory

AT THE recent meeting of the New England Gas Association, Mr. E. S. Dickey, of the Maryland Meter Works, stated in no uncertain terms that salesmen are **not** born. The inference then, we take it, can be drawn to the effect that salesmen are trained and developed, just like the rest of us mortals. This is indeed a refreshing thing to know, for it at least affords some tangible benchmark from which we can start to survey this much-talked-of business, or as it is commonly dubbed, profession of selling.

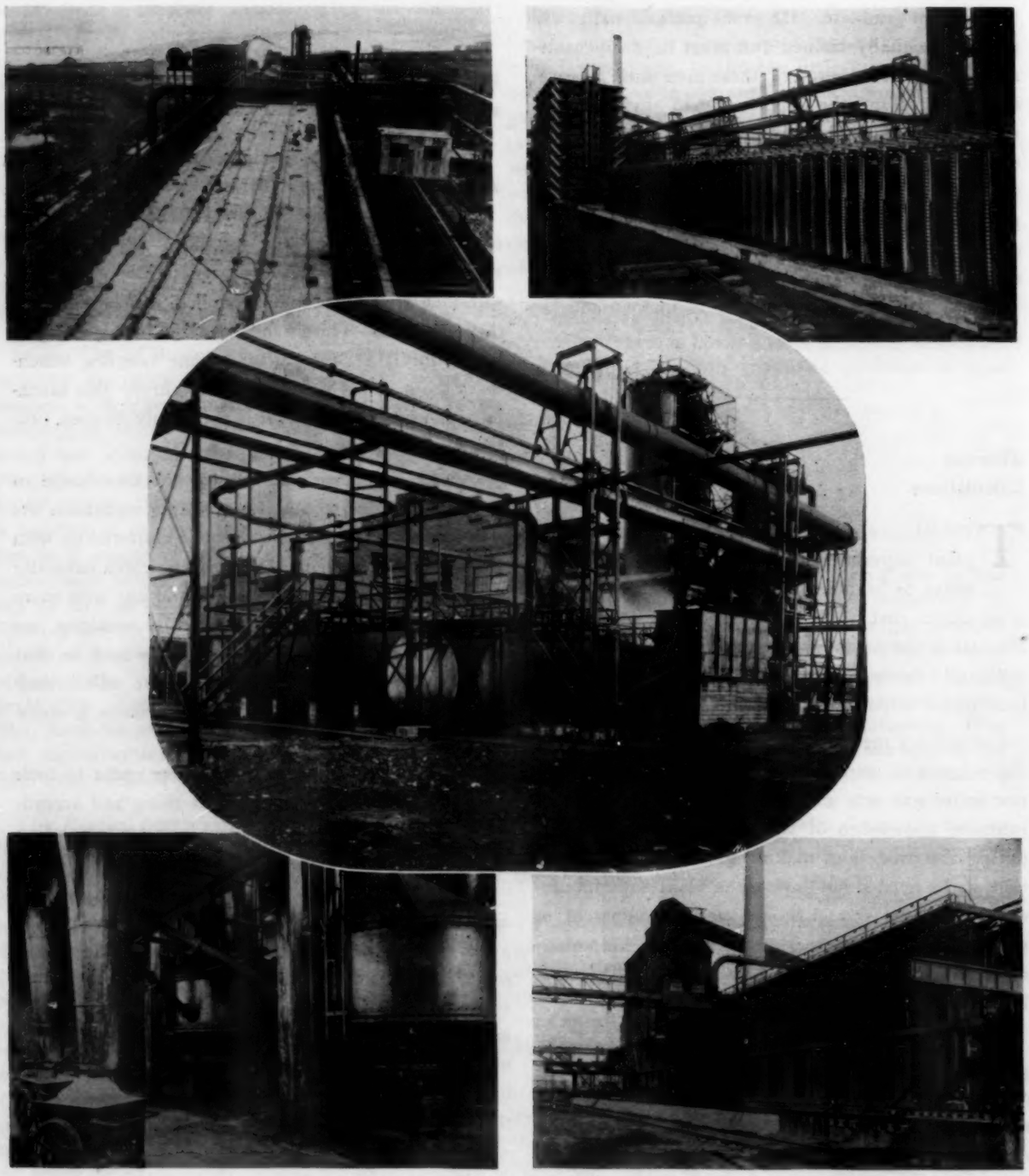
During and since the War a veritable horde of men have rushed pell-mell into selling vocations. As a consequence this field has become cluttered up with an unduly large percentage of misfits which naturally tends to make the top-notchers stand out with more than ordinary prominence. Generally speaking, we believe that many of these misfits would be but mediocre performers in any other line unless they radically changed their attitude and made a study of their particular line of work.

Perhaps many of us gas men have come to look upon selling as a very mysterious thing and accordingly have been somewhat awed by a contemplation of it, to the detriment of our sales volume.

Let us realize that the ability to sell gas and appliances is something that can be acquired by a great number of men if they will but bestir themselves and sense that, as in any other line of human endeavor, careful study is a prime necessity. Good sales ability will not obtain merely through the medium of one's sitting down and waiting for it to happen, and in the meanwhile consoling himself with the flimsy shibboleth that "salesmen are born."

Mr. Dickey has done the industry a favor in puncturing an old myth. If gas companies will profit by it they will have gone a long way toward solving their sales problems.

Some Views of the Wilputte Plant at Everett, Massachusetts



Upper Left—Top of Battery and By-Product Plant. Upper Right—Water Cooling Tower and Liquor Cooling Coils. Center—General View of By-Product Plant. Lower Left—Ammonia Saturators. Lower Right—Battery of Wilputte Ovens from Pusher Side

Serving Both Gas and Steel Plants with Modern Ovens

Everett, Mass., installation of Wilputte coke ovens shows excellent yields—Plant has new charging system and numerous unusual features of construction

By R. S. McBride

Consulting Editor, American Gas Journal

THIRTY years of progress in coke-oven building is strikingly displayed in the new Wilputte-oven plant of the New England Fuel and Transportation Company, at Everett, Mass., which stands parallel to and only about 200 feet from eight batteries of Otto-Hoffman coke ovens which were built by this company between 1897 and 1899. The new battery of 55 ovens, which was erected during 1926, was required to increase the coke-making capacity of this plant. The additional coke was required to supply both the household market at Boston and the blast furnace of the Mystic Iron Works, which is affiliated with the producing company through common ownership by the Massachusetts Gas Companies. The surplus gas is sold to the Boston Consolidated Gas Company.

This Boston installation is an interesting example of a coal-processing plant existing as a part of a general industrial organization. The manufacture of coal products is here made, as some think it always should be, an independent multi-product manufacturing operation. Under the circumstances of ownership of this plant it is possible to have a co-ordinated sequence of coal mining, shipping, coking, blast-furnace operation, and city-gas sales. It may be, therefore, that this installation will be found to point the way for sound economic development of the coke industry as well as to show the coke and gas industries certain novel and valuable technologic advances.

Rapid Construction Work

The new battery was contracted for on March 5, 1926, and a few days later ground was broken by the New England Fuel and Transportation Company for the excavation work. The first pile was driven in these excavations in April and approximately eight months later, on December 15, 1926, the first coke was pushed from the ovens, anticipating by 45 days the contract guarantee as to completion. This speed of construction represents an amazing contrast with the time of construction required for coke-oven batteries only a few years ago. The speed is especially notable when one realizes that the entire plant is built on made land and is supported on piling. Approximately 4,700 piles were required for the battery and by-product plant. The design called for this large number so that loads would not exceed 12 tons per pile.

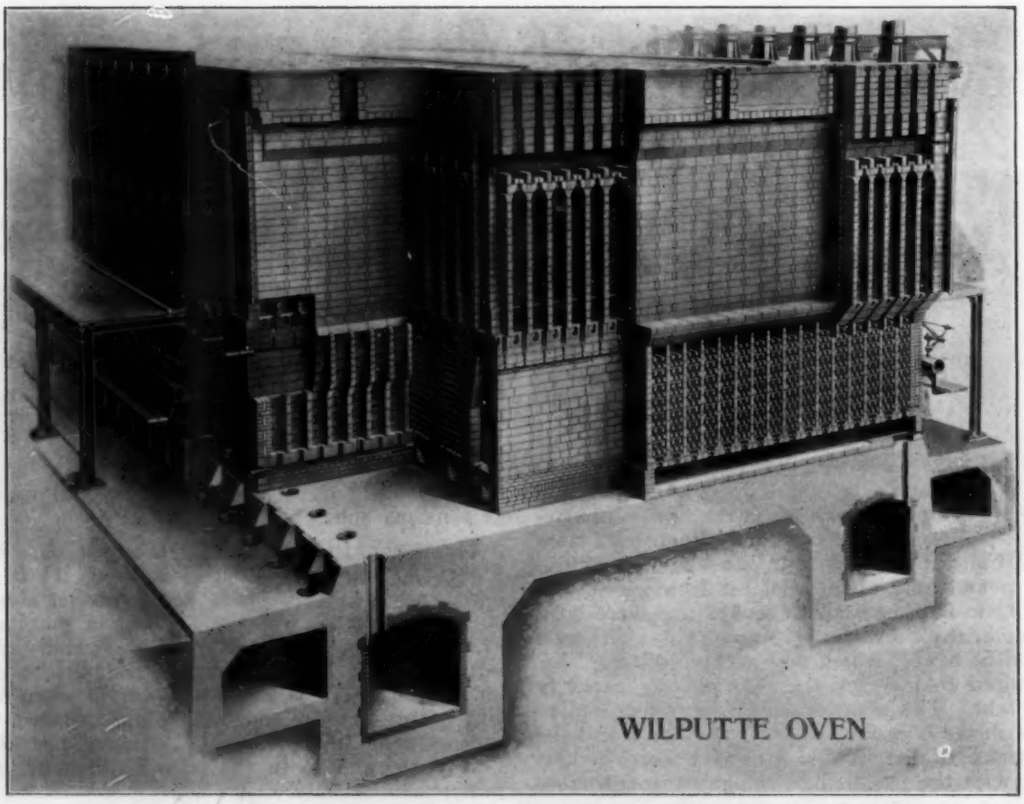
The new battery includes 55 ovens, each with coal space approximately 40 ft. 6 in. long, 11 ft. 10 in. high, and from 15 in. wide at the pusher side to 17 in. wide at the coke side, holding a maximum of 31,000 lbs. of coal. Each oven is normally charged with 30,000 lbs. of coal and is designed to operate on a coking time as short as 15 hours when desired. But at present the plant is being operated with a gross coking time of nearly 17 hours; the net time that the charge is in the oven is 16 hours and 25 minutes.

Single-Hopper Charging

The most distinctive feature of this battery is the use of a single-hopper charging larry which fills the oven through a single charging hole. Two gas-collecting mains are used, one on each side of the battery, and there are off-takes at both ends of each oven to give outlet to both collecting mains. This system, a patented development of the engineers of the owner company, has afforded rather unusual operating results. Designed to save the gas ordinarily lost during charging, and to reduce the smoke nuisance and other complications of the usual charging systems, the plant has more than demonstrated its intrinsic merit in the increases of by-products and gas yields which are afforded.

One might expect that introducing the coal through a single charging hole would produce complications and delay the completion of charging. As a matter of fact, the crushed coal, if containing not over 3 per cent of moisture, sufficiently distributes itself along the entire length of the oven without leveling so that the charging larry can usually leave an oven within 45 seconds of the time it begins to introduce the coal. In fact, during normal operation with such coal the leveling by the pusher does not begin until after the larry has moved on and the charging hole has been luted shut. If the moisture in the coal exceeds 3 per cent, approximately two-thirds of the charge will flow from the larry into the oven without leveling. The balance enters the oven readily during leveling.

In order to determine to what extent the drier coal did distribute itself along the length of the oven



Phantom View of Oven Heating System

a few charges were coked without leveling. It was found that the coal against the doors was at the normal level under these conditions. This indicated that the angle of repose of this fine coal is very different in a hot oven than it would be in an ordinary undisturbed storage pile. Apparently the particles of coal are distributed throughout the length of the oven by the gases generated from the coal in contact with the hot oven walls, and the coal charge becomes in effect a liquid so that angle of repose is entirely obliterated. It is, however, the regular practice at this plant to level the coal in each oven carefully, just as is customary in all types of multiple-charging hole installations.

Coal Mixture Used

Much of the coal used at this plant is brought from company-owned mines by company-owned steamers. It is handled direct from the ocean-going vessels over the docks in the adjoining fuel yard by one of the finest coal-handling plants in New England. The mixture being coked in the new Wilputte ovens consists of "Federal" high-volatile West Virginia coal, Pocahontas low-volatile coal, and Imboden seam low-sulphur high-volatile coal. This mixture affords the requisite high yield of gas, a strong metallurgical coke, and a low sulphur content in both gas and coke. The yields of all products are, indeed, rather unusual, as will be seen from the figures given later in this article.

The coal storage and coal handling equipment required for the new battery was not extensive, because the coal could be handled with the system already in use for the Otto-Hoffman oven plant. There was required only an extension of the coal conveyor from above the coal storage bunkers on the old batteries to the 2,000-ton two compartment bunker above the new one.

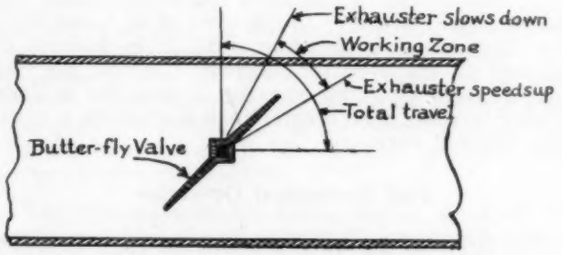
This new bunker is of steel and concrete construction. Instead of sheet metal sections for filling the structural steel frame work, a precast reinforced concrete slab about 4 in. thick has been used. This is bolted in place on the structural frame work. This design was selected to eliminate the damage by corrosion which is commonly a serious factor on steel plate used in such coal bunkers above ovens. It is anticipated that this sectional construction of concrete will be of almost indefinite life.

Heating Gas System

The Wilputte oven as built at this plant consists of the usual rectangular coking chamber heated from the two side walls by a system of vertical flues. A portion of the oven gas made is used for heating the ovens in this plant, but blue gas may be substituted later if desired. The heating gas for each oven is introduced through the "gas gun" by a steel pipe projecting into the masonry beneath each heating wall, the quantity delivered to each flue being regulated by the size of the port in the usual type

of replaceable gas nozzle, a refractory block set in the base of each heating flue.

The heating gas is measured before use by a Connersville impeller-type meter, and a Thomas calorimeter of the continuous automatic recording type is used on this line to record the heating value of the gas used. This calorimeter is checked from time to time with a standard flow-type instrument.



Shallcross Pressure Control Unit
Diagram Showing Functioning of Butterfly Valve in Reference to Speed Control of Exhauster

The air required for combustion is supplied by a Sturtevant Silentvane fan with electric motor drive and has Shallcross regulation for pressure control. It enters the base of the regenerators through perforated steel pipes and is apportioned to each heating flue in exactly the quantity desired by properly sized ports drilled in this pipe and reamed accurately to size. The air for each heating flue passes through a separate regenerator chamber; thus the proportion of gas and air for each flue is exactly controlled both to maintain the proper ratio between air and gas and the proper quantity of total heat in each separate flue.

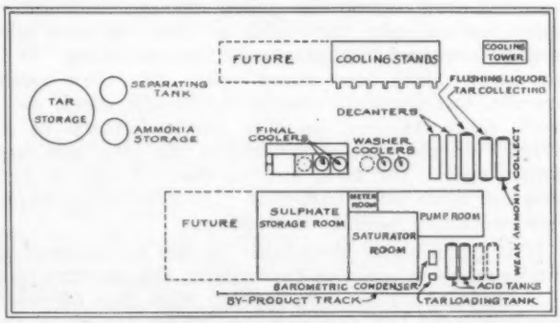
The burning of the gas takes place upward in each flue and the products from the flues in one-half of each heating wall collect in a horizontal flue at the top, pass lengthwise along the heating wall, and downward through the heating flues in the other half of the same wall. The products escape from the bottom of this heating flue through the multiple-regenerator system and into the waste gas flue at the bottom. The quantity of products exhausted through each regenerator section is controlled by a separate port in a cast-iron plate at the base of the individual regenerator. Under this heating system each port for air, gas, or products of combustion is separately sized because each port performs only a single function. In many preceding oven systems it has been necessary to use a single port not only to control incoming air, but also outgoing products; and therefore it was necessary at times to compromise in size between two ideal conditions.

Under the battery and running lengthwise of the whole system are four conduits, two for air and two for waste products. Thus at no time does incoming air use the same passages as outgoing products, except within the regenerator units which are filled with checker-work. The air and the products of combustion are both held at constant pressure by automatically controlled Shallcross units. Thus the air intake is independent of stack draft and the combustion control becomes independent of vagaries of stack temperature.

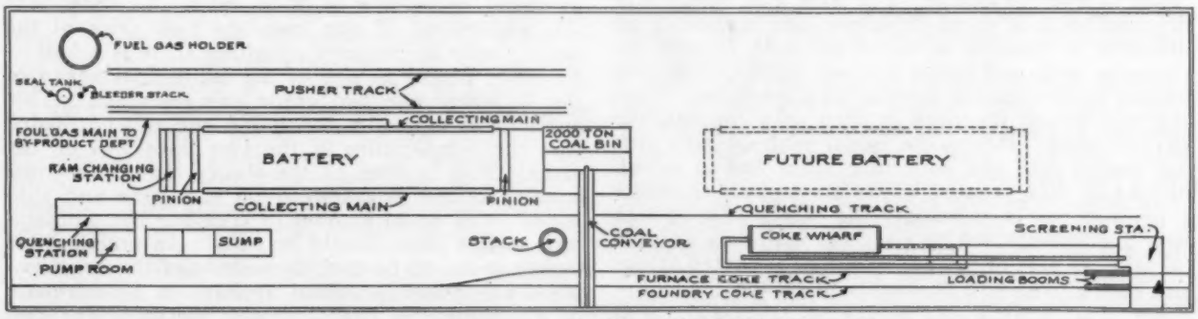
Three Reversal Machines

The operation of heating is "reversed" at thirty-minute intervals, that is, the direction of burning is changed from one-half of each heating wall to the other. Thus the flame travels upward in the flues on each half of each heating wall only in alternate half hour periods; the products of combustion pass downward in these same flues in the other periods.

The reversal mechanism consists of three machines functioning with automatic clock control to produce reversals of flow of the heating gas, air and products of combustion from one side of the battery to the other. One machine operates the four control dampers on the two waste-gas ducts and the two air ducts. Two separate machines operate on the gas and decarbonizing air, one operating the gas cocks on the pusher side and the decarbonizing air cocks on the coke side of the battery; the other operates the two sets of cocks on the opposite sides. All three machines are provided with hand wheels which will per-



By-product Plant Layout



Layout of Battery, Coal-Handling and Coke-Handling System

mit manual reversal in the event of the failure of the electric current, failure of the control clock, or any other failure which interrupts the automatic functioning of the apparatus.

To insure that the heating gas ports are kept free from carbon deposited by cracking of the heating gas, "decarbonizing" air is introduced through the gas guns on the "off" side of the battery during each cycle. This air passes in through the gas ports, burns off incipient carbon deposits and passes out with the products of combustion through the regenerator system. This air is supplied to the system at about one pound pressure from a General Electric motor-driven single-stage centrifugal air compressor. This scheme of continuous decarbonizing appears to have an important advantage, reducing materially the amount of adjustment and maintenance work required from the heater man. The "punching" of nozzles is practically eliminated.

Battery Labor Required

The crew for operating an installation of this type of oven consists of nine men per shift—a foreman, a heater, a pusher man, two luters (one on each side of the battery), a hot-car operator, a door-machine man on the coke side, a coal larry man, and a standpipe maintenance man. On the day shift there is also one mud mixer who grinds enough mud for 24 hours use and any yard labor or clean-up men who may be required to insure good housekeeping. It is not known just how many ovens this crew could operate, but certainly they could handle much more work than required on this single battery of 55 ovens. In the case of several of the jobs one man would suffice for two, and in case of one or two jobs for three such batteries. In other cases duplicate workmen would be required.

It is particularly noticeable to one accustomed to the usual oven practice throughout the country how the single charging hole system with two off-takes has improved the working conditions for all of the battery crew. Since coal flows in through only one opening and at the time of charging fills this opening up to the battery top, there is no opportunity for the gas to escape from the oven through the charging hole. Hence the smoke and flame nuisance is practically eliminated.

Charging Procedure

It is the practice at this plant to introduce the coal into the oven a few moments before the pusher is ready to level the charge. The larry man finds (with dry coal, that is up to three per cent moisture) no difficulty in running in all of the coal, closing the charging hole, and luting it down within about one minute of the time of starting this operation. During this period the oven is open only through the gas off-takes. Hence the initial rush of very rich gas passes into the collecting main and is saved, instead of being vented to the atmosphere to create a nuisance, as is commonly the case. This system would, obviously, not be a success with only a single off-take, as part of the gas would be pocketed at one end of the oven and be unable to escape.

When the pusher man is ready to level the coal in a freshly charged oven a steam jet is opened to produce a mild injector action through each off-take into the collecting mains. Hence the oven is put under a slight vacuum and there is a slight induction of air rather than out-rush of smoke and rich gas at the levelling-bar door. As one of the operating engineers of the company said, in referring to freedom from smoke, "We go the packing house one better. We save the squeal."

In this system of operation the off-takes and collecting mains are open to the oven at all times from the beginning of charging until it is desired to damper off the oven for pushing. Despite the fact that a single charging opening is used the spillage during leveling is no greater than normal for a properly handled oven.

Full Mechanical Operation

The larry car has two cabs, one for each direction it moves; the operator can, therefore, see where he is going and avoid hitting obstacles left on the battery top or men working there. The single coal hopper of the larry car is mounted direct on a scale. Thus the tare weight is reduced to a few tons contributing to accuracy and at all times the larry men can tell how fast the coal is flowing into or out of the hopper by noting the pointer on the large scale dial.

The larry car, the hot coke car, and the clay cars were all built by Atlas Car and Manufacturing Company. The hot coke car has electric driven motor drive on its discharge gates, to avoid freeze-ups often experienced with hydraulic or air operated units. The electric drive also affords better speed and position control of the gates. The locomotive handling this car is a separate unit, a 20-ton "G. E." machine.

An electric elevator is used for raising clay mud to the working level or for carrying materials to the battery top. The clay carriers (lute cars) are also electrically driven and have electric elevation of the luting platform. Coal spillage is collected on the pusher, dropped in a hopper by its track, and conveyed by a worm cross conveyer to the base of a belt and bucket elevator which returns it to the coal bunker. Thus, one notes, the complete mechanical system to save manual labor at all stages.

Crude Gas Handling

The raw gas from the two collecting mains is brought together near one side of the battery by an overhead connection of 30-in. main. In order that the withdrawal of gas from the two sides of the battery may be properly equalized there is a butterfly valve placed in one of the mains just ahead of the Y where the two crude gas lines join. This butterfly is manually controlled and is so adjusted that the temperature in the two lines will be the same. This is done on the theory that if an equal amount of gas is taken off on each side and subjected to an equal amount of spraying the temperature at this point should be equal. In practice this theory seems to be entirely sound and the very simple arrangement provided appears to be adequate to distribute the gas accurately between the two sets of off-takes.

Just beyond this junction Y the total amount of gas made passes through another butterfly valve controlled with the latest type of Shallcross regulator. The regulator functions with a two-speed mechanism and controls both butterfly valve position in the raw gas line and exhauster speed in the by-product house. The high speed butterfly valve adjustment cares for sudden rushes of gas during charging and the low speed for accurate pressure regulation during normal operations. Whenever the butterfly valve can not alone care for the required changes it passes outside of its normal working zone and thereby automatically causes the exhauster to speed up or slow down until the valve returns within its working zone. The pressure maintained in the collecting mains by the regulator system is between one and two millimeters above atmospheric.

The accumulation of heavy tar or pitch in the cross-over from the off-take to the collecting main is prevented by the use of a liquor spray; and another liquor spray directed toward the point of outlet is placed in the collecting main between each pair of off-take valves. No seal is maintained on the dip pipe.

By-Product System

The raw gas travels through a 36-inch suction main from the battery about 200 ft. across one of the plant roads to the by-product department. Here it passes in succession through a primary washer-cooler, exhauster, tar extractor of P. & A. type, heater, ammonia saturator, acid-spray separator, final cooler, station meter, and then mixed with gas from the Otto-Hoffman ovens to an adjoining plant of the Boston Consolidated Gas Company. Duplicate units are provided as spares for each item from primary to final cooler. The fuel gas is taken from the line to the gas company plant into a small holder which floats on the fuel-gas line in order to give capacity and prevent pressure surges during reversals of the heating mechanism.

The primary washer-coolers used are direct contact towers filled with wood slat trays laid crisscross in the steel shells which are approximately 10 ft. in diameter by 60 ft. high. The exhauster which pulls the gas from the battery through these primary coolers is a General Electric single stage turbo exhauster driven by a steam turbine. Operating normally at about 7,600 r.p.m., the turbine is run condensing, with a Schutte and Koerting multi-jet condenser with salt water cooling.

The liquid collected from the raw gas in the primary cooler and tar extractor system is gathered together in a tar-liquor separator tank, or decanter. The cooling system is so operated that a minimum of ammonia liquor is made, since it is desired to have a maximum percentage of the ammonia recovered directly as sulphate from the saturator. That surplus liquor which is inevitably produced is pumped to the ammonia plant of the old Otto-Hoffman ovens to be converted into sulphate.

The weak liquor formed in the primary coolers is cooled in a closed-coil system of 46 banks of 32 pipes each by salt water sprayed on the coils. The coils are sherardized pipe and the salt water supply line of galvanized metal. At this point one of the refinements in detail of design in this plant is notable. By careful adjustment of the spray boards on this cooling system an improvement of 10 degrees F. in the cooled liquor temperature has been found possible without any increase in water consumption.

Pitch Handling With Steam

In the flushing tanks and some other units of equipment difficulty was at one time experienced with the accumulation of naphthalene and pitch sludges. If these were allowed to settle and consolidate their removal afforded a difficult and obnoxious task for the plant workmen. The engineers of the plant conceived the idea of softening and moving the sludges with steam. Perforated steam coils were placed near the bottom of the equipment where this difficulty was experienced or anticipated and a steam jet located in the outlet lines. It has been found possible when such sludge accumulates at these points to turn on the steam, soften the sludge, and without any hand labor move it along through the outlets to the proper point of disposal. To assist in keeping the tar soft and moving in the desired direction the steam jet is used in the discharge line as an injector in addition to the live steam used in the coils for the softening of the sludge. This combination is estimated by engineers of the plant to save approximately $5,000 per year in plant labor. The cost for the steam is negligible by comparison.

By-Product Yields

The by-product equipment used for ammonium sulphate manufacture consists of reheaters, separators, centrifuges, acid separators, and sulphate handling equipment. The saturators are of lead-lines cast-iron 13 ft. in diameter; the acid separators are lead-lined steel shells of the cyclone type. Lead-lined cast iron is used for the drain tables. Unloading plows are used for removal of sulphate from the baskets. The Fletcher centrifugal driers are 40-in. units of the suspended cantilever type driven by steam turbines mounted directly on top of the frame. The frames are of novel design being specially shaped to suit direct turbine drive instead of the usual frame adapted from the old engine and belt drive.

In the sulphate storage room it has been found feasible to use a single automatic loader either for carrying the sulphate from the barrows onto the stock pile, or from the pile into the bagger hopper, or from barrows or pile into a freight car when loading in bulk is in progress. Thus the single elevating unit is serving three distinct functions with full satisfaction.

Operating results from the new battery are available for the calendar year of 1927. These show very favorable yields, especially of gas and ammonia. The operating engineers believe that the single-charging-hole system should be credited with a substantial part of the advantage above the yields which would have been anticipated in an ordinary type of installation using the same coal. Not only does this scheme save the richest gas given off during the initial minutes, but it also, because of two off-takes, reduces the length of the travel of the gas within the oven. This last advantage combined with the

cool tip is, of course, favorable to the production of ammonia and high B.t.u. gas; and it is likely to result in a minimum production of naphthalene, pitch, and like objectionable constituents of the raw gas.

For the calendar year 1927, the coal averaged 2.82 per cent moisture and 32.19 per cent volatile; the B.t.u. in the total gas per pound of dry coal was 3,430, and the B.t.u. used to carbonize a pound of dry coal was 1,085. Per net ton of dry coal there was produced 10.46 gallons of tar, and 24.7 pounds of ammoniam sulphate.

Gas and Coke Distribution

As the plant is now operated the gas made has a heating value between 600 and 615 B.t.u. per cu. ft., averaging 608 B.t.u. for 1927. This gas is mixed with low heating value gas from the Otto-Hoffman ovens to give a total production of about 18 million cu. ft. per day of 560 B.t.u. gas. It is interesting to note that the total gas from the new battery is very low in inert-gas content, averaging only 3.6 per cent N_2 for 1927.

The coke made in the Wilputte ovens is first screened to give blast furnace coke and under-size material. The latter goes to the domestic coke division of the company where it is rescreened into stove, nut, pea, and breeze, mainly to supply household fuel requirements. The Otto-Hoffman ovens of the company are operated on the same coals and furnish foundry coke. The under-size of this material also goes to domestic sales division for household supply.

In general, breeze from both classes of coke in the Boston district has a market value of about 60 per cent of the price of steam coal at the same point. This means an average of about $3 per ton for Boston, where steam coal is currently about $5 per net ton delivered.

The New England Fuel & Transportation Company has found it desirable after considerable experience to install their own coke-sales and coke-delivery system. They are thus in control of the fuel clear to the householder's basement and can maintain satisfactory and prompt delivery. The current price of domestic coke is $13 per ton in the customer's bin. This is in contrast with $16 per net ton for anthracite. The local coke market has been so well developed that it is not uncommon for the company to crush some coke that would be large enough for foundry or blast furnace use in order to maintain their supply for household sales.

Coke Oven Accidents

ACCIDENTS at coke ovens in the United States in 1926 resulted in higher fatality rates, in relation to number of men employed, than are usually experienced by the coking industry. The increased accident rates were due mainly to a disastrous explosion of gas at a by-product plant in Indiana, but even without the fatalities and injuries resulting from this explosion the accident rates for the industry were somewhat higher than in 1925.

The returns from the operating companies showed 23,115 men employed at all plants and indicated a volume of labor equal to 7,286,605 man shifts, an average of 315 workdays per man. The number of men employed was 139 less than in the preceding year, but an average increase of five working days per man raised the aggregate number of man shifts of labor performed to a point about 1 per cent more than in 1925. As compared with the half decade 1921 to 1925, the number of employees in 1926 represented an increase of 12 per cent and the man shifts worked about 19 per cent.

The tabulations given below show the men employed, fatalities and injuries for the periods indicated:

PERIOD	Av'ge days active	Men Employed—Actual number	Men Employed—Equivalent in 300 day workers	Number Killed—Total	Number Killed—Per 1,000 300 day workers	Number Injured—Total	Number Injured—Per 1,000 300 day workers
Beehive Ovens							
Av'ge for years 1916-1920, inclusive*	289	15,624	15,049	18	1.18	1,649	109.54
Av'ge for years 1921-1925, inclusive*	199	7,218	4,793	7	1.34	528	110.15
Year 1926	220	6,605	4,847	6	1.24	645	133.07
By-Product Ovens							
Av'ge for years 1916-1920, inclusive*	349	15,034	17,508	41	2.36	3,789	216.43
Av'ge for years 1921-1925, inclusive*	352	13,365	15,700	22	1.41	1,371	87.35
Year 1926	353	16,510	19,441	45	2.31	1,277	65.69
All Coke Ovens							
Av'ge for years 1916-1920, inclusive*	319	30,658	32,557	59	1.82	5,438	167.02
Av'ge for years 1921-1925, inclusive*	299	20,583	20,493	29	1.40	1,899	92.68
Year 1926	315	23,115	24,288	51	2.10	1,922	79.13

* Calculations based on the sum of 5 years rather than on average of 5 years.

Abstracted from Technical Paper 437, Coke Oven Accidents in the United States, by Wm. W. Adams, U. S. Bureau of Mines.

The fatalities and injuries for all coke ovens, by causes, for the periods indicated are tabulated herewith:

Cause	—Fatalities— Total 1925	Total 1926	—Injuries— Total 1925	Total 1926
Cars, lorries and motors	8	5	129	151
Railway cars and locomotives	3	5	32	41
Coke-drawing machines	1	..	34	40
Electricity	1	2	23	18
Falls of persons	2	8	205	266
Hand tools	..	..	155	142
Suffocation from gases	4	2	13	20
Burns	2	3	231	215
Gas explosions	..	19	7	59
Dust explosions	..	..	13	6
Falling objects	1	3	226	231
Nails, splinters, etc	..	..	41	70
Run of coal or coke	..	1	19	25
Other causes	6	3	568	638
Totals	28	51	1696	1922

Below are shown the number and classification of injuries, 1916 to 1926:

Character of disability	Total 1916-1920 Number	Total 1916-1920 Per cent	Total 1921-1925 Number	Total 1921-1925 Per cent	1921	1922	1923	1924	1925	1926
1. Fatal	290	1.08	143	1.48	17	29	45	24	28	51
2 Serious (time lost, more than 14 days):										
a. Permanent disability—										
Total*	11	.04	6	.06	.....	1	5	.....	.....	2
Partial†	423	1.54	212	2.20	24	35	71	38	44	46
b. Others	3,902	14.20	2,167	22.48	318	387	625	431	406	472
3. Slight (time lost, 1 to 14 days, inclusive)	22,852	83.14	7,112	73.78	1,511	1,287	1,892	1,176	1,246	1,402
Total injuries	27,188	98.92	9,497	98.52	1,853	1,710	2,593	1,645	1,696	1,922
Total fatalities and injuries	27,484	100.00	9,640	100.00	1,870	1,739	2,638	1,669	1,724	1,973
Men employed, average per year	30,658	.....	20,583	.....	16,204	19,278	23,729	20,451	23,254	23,115

* Permanent total disability: Loss of both legs or arms, one leg and one arm, total loss of eyesight, paralysis or other condition permanently incapacitating workman from doing any work of a gainful occupation.

†Permanent partial disability: Loss of one foot, leg, hand, eye, one or more fingers, one or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

The loss of time from accidents in 1926 was estimated as follows:

	Lost days
51 fatalities, at 6,000 lost days each	306,000
2 permanent total disabilities, at 6,000 lost days each	12,000
46 permanent partial disabilities, at 800 lost days each	36,800
472 temporary disabilities of more than 14 days, at 32 lost days each	15,104
1,402 temporary disabilities of 1 to 14 days, at 6 lost days each	8,412
Total, 1,973 injuries	378,316

The main hotel at the summer resort operated for employees of The Peoples Gas Light and Coke Company and other Chicago utilities

Turning Over the Turnover Problem

By Felix B. Streyckmans

The Peoples Gas Light and Coke Company

EMPLOYEE-TURNOVER is costly; it should be kept at a minimum! Changing personnel means corporate betterment, adds new life and brings wider viewpoint and valuable ideas; employee-turnover should not be held down! Here is a made-to-order subject for the pseudo-savant who believes dogmatically that there are two sides to every question.

His platitude is a truism—there are two sides to every question — and there are two sides to every sheet of flypaper, too, but only one side means anything. The attempt here is to prove that the side of the question with the meaning is: "Employee - turnover is costly; it should be kept to a minimum."

Technically, turnover is the number of employees lost in proportion to the total personnel. But that definition, like the untenacious side of the flypaper, is meaningless. If increased efficiency such as reduced routine permits the dropping of an employee without replacing him, the loss is really a gain, and there is nothing in the event that requires labor-problem analysis.

If dollars-and-cents losses on the one hand and new blood and new ideas on the other are to enter the discussion, turnover must be confined to the discharge of an employee who is replaced by someone from outside the organization.

Peoples Gas Post, American Legion drill team composed of employees of the Chicago Gas Company

What, then, is the dollars-and-cents cost of replacing an employee? It might be anything from ten dollars spent on "breaking in" a new office boy to ten thousand dollars or over required in acclimatizing an executive. The thousands-of-dollars cases are not too extreme and instances of hundreds-of-dollars losses

are not rare. Acquainting a new industrial sales engineer with the intricacies of utility service, the myriad applications of his sales and engineering knowledge to his new work and his new duties and environment is a good year's work. Add to this the time spent by his associates in coaching him and the fact that the year-old sales engineer is rarely as valuable as the two, five or ten-year-old employee he has very probably replaced, and the loss can be conservatively put at several thousand dollars.

Position and Turnover

It must be granted, of course, that the lower-salaried employees are the more numerous and the average cost-of-loss is nearer a hundred or so than a thousand dollars. But if new ideas, wider viewpoint, increased vitality and general betterment are to result from a turnover, the position affected must be of some importance or the new employee cannot exert a very worthwhile influence.

For a mere sum of five or ten dollars a new office boy can be so trained that he will serve as efficiently as a predecessor. A typist can learn the company's forms within a very short period, and only the first few days of her work will show slowness or inaccuracy due to unfamiliarity with her new position. But, obviously, the new vigor and impetus given to an organization by the turnover of that type of personnel is negligible, if any exists at all.

For the effect of the new individual to be worth while, the position filled must be of some importance. And positions of importance are filled most efficiently by promotion from within the organization. Especially is this true in the business of utility service where there is a complexity of routines and other factors.

The gas man rarely grows stale in his job—he is more likely to become seasoned in it. A short time ago, four inspectors, whose principal duties were turn-on and cut-off work, were offered a promotion after fifteen to twenty years of efficient service in that same capacity. They thanked their superior sincerely for the offer—and declined. They said that the best reward they could think of was to be allowed to continue doing the same work—that they liked their work, had reached a high efficiency in it through long experience, were limited in education and other faculties and were doubtful whether they could serve better in any other way even after extensive training.

The Efficient Inspectors

These four inspectors were doing excellent work, establishing pleasant contacts with those whom they served and creating good-will for the gas company because they liked their work—and after fifteen and more years at the same job! Surely there was not a trace of staleness there; not a bit of inefficiency either. Their long experience had made them experts in pipe and appliance testing, leak detecting and other routines that come up in their work. They possessed the solution for practically every problem that an inspector must face.

New spirit or increased vitality could never take the place of the contentment these men enjoyed. New ideas could never compensate for the short cuts that years of long experience had taught them. Turnover would be undesirable here from any angle and at any price.

The example is not an isolated case, dug out after much research to illustrate a point. Promotions are sought, of course—and they are given—but there is a good percentage of employees who have found the work they want and are thriving on it. Why disturb them? Increases in pay will provide the new vitality if any is necessary.

The intangibility of increased vitality through changes in personnel is such that theories and opinions as those cited are presumably the only bases for analysis. However, the matter of securing new ideas from new employees is a subject that is adaptable to tests and cases.

The Suggestion System

Since 1924 the Peoples Gas Light and Coke Company has been operating a very comprehensive and highly successful suggestion system. This entire activity treats solely with encouraging ideas from all the company's 4,000 employees, deciding upon their practicability and giving cash awards. Suggestions for betterment of any phase of the company's business in all departments by any employee are submitted to the secretary of the suggestion committee anonymously on numbered blanks. The author of the idea is not known until after his suggestion has been finally ruled upon and the award announced.

There are no restrictions on the nature of acceptable suggestions; they range from production operations to billing and public relations. All employees are given equal opportunity to engage in this activity and all suggestions are judged with equal fairness. Because of the anonymity of the suggestor, length of service or the nature of the employee's work can have no effect upon the way the idea is considered or the value placed upon it. Perhaps no better test could be devised to determine the source of workable ideas obtained from employees than the activity of the suggestion system.

Since the system has been in effect about five thousand ideas have been submitted, 503 of which have been adopted and paid for in cash awards totaling $4,370. The minimum award under the rules of the system is five dollars and there is no maximum. With new ideas being submitted at the rate of four and five each working day, it is to be expected that the greater proportion of them are of a minor, often inconsequential nature. It is equally obvious that the greater number of awards are in five-dollar amounts.

High Value of Employee Suggestions

Nine of the suggestions, however, were valued at from fifty to two hundred dollars, and the eight authors received total awards of $1,100. Of the 503 workable ideas awarded $4,370, the nine awarded $1,100, on an average, were valued at about one-fourth the entire other 496. In other words, nine suggestions were made, each of which on an average

was worth fifteen times as much as the average of the others.

If the new employee is valuable because of his ideas, new employees would be well represented among the eight originators of the highly paid for suggestions. But the opposite is true. The average length of service of the eight suggestors was twelve years. Only one was a comparative newcomer with one year's service. The next youngest in service had nine years to his credit and the others ranged from eleven to twenty-three years. The employee with the longest service—twenty-three years—originated the most valuable idea—the $200 one—and accounted for two of the nine exceptional suggestions, having merited a $50 award as well.

The circumstances are similar all through the list. The gas men who know all the "whys and wherefores" of the routines and how they jibe through the various departments are offering the worthwhile ideas on gas company betterment. The new employee is on the alert, willing, anxious and active, but inadequately equipped by lack of gas company knowledge to make his ideas fit. Suggestions come from new employees on "better" ways of doing things that show the suggestor had the wrong idea of why the thing is being done and what result is expected.

Turnover Within the Company Is Preferable

Transfer, or turnover within the company, seems a better way of establishing life-sustaining circulation. It is a better way of culling ideas as well, since a newcomer to a department has all the advantages of being a new employee with the additional advantages of being a gas man.

When an employee leaves the gas company, therefore, there is a loss, no matter how great is the necessity of removing him from his position. He is a gas man, at any odds, and only another gas man can take his place. And until the new employee becomes as versed in the routines and complexities of gas service as his predecessor, that loss continues, in some measure at least.

Transferring, rather than losing, the employee seems a better way of making a change if a change becomes necessary.

Believing firmly in the theories just sketched, the Peoples Gas Light and Coke Company is engaged in every provenly practicable method known to it to keep employee-turnover to within an ace of absolute zero.

The administration believes, too, from results, that this can and has been done. "Once a gas man, always a gas man," is axiomatic with the Chicago company. This axiom and this belief are predicated not upon the turnover figures of the employment department, but upon the loyalty, spirit and contentment shown by the individual members of what has come to be known as "the Peoples Gas Company family."

Turnover figures, because they are, like all statistics, unelastic and inhuman, do not tell the story. Although these figures show a monthly turnover among salaried personnel of two and one-half per cent, the gas company rarely loses a gas man. Nine in every ten of this two and one-half per cent are employees who have been with the company a year or less—employees who, on the basis of the foregoing reasoning, have only just begun to become gas men. They are employees who are not fitted for utility service and, fortunately for them and the company, both have found it out before the investment of either in the other has become very great. The loss is compensated by avoiding what would be a greater loss later.

When Turnover Is Desirable

Thus the "two sides to every question" enters the subject again. Turnover is desirable when it occurs among personnel not yet absorbed and avoids the greater loss of turnover among better established employees. Since the minimum in turnover is desired, but absolute zero cannot be achieved, the greater the turnover among the newer employees, the less is the loss.

This low loss among the absorbed personnel in the Peoples Gas Company has been in inverse proportion to the extent and intensity of its industrial relations activity. And low turnover is considered such an asset that every known successful industrial relations activity that can be applied in the company is strongly followed. Everything is done that can be done to make the gas company "a good place to work."

A mere listing of these industrial relations activities is given (without recital of their collateral applications or myriad benefits), not because they are new, but as an indorsement of them. The administration of the Chicago gas company is convinced that none of them is superfluous—that each has its contributory effect upon the attainment and maintenance of low employee turnover. They follow:

Duties of Industrial Relations Department

Industrial Relations Department—Responsible for the promotion of the general well-being of employees and harmonious relations between the employees and the management. The manager of industrial relations has administrative responsibility for developing and carrying out a comprehenisve personnel and employment policy and for co-ordinating the work of the industrial relations department with the personnel activities of the company committees and of employees' associations.

Employment Division—Responsible for securing, hiring, transferring and promoting employees. It reviews all cases of employees' separations from the service and maintains official records and statistics of employees and of their progress with the company.

Women's Department—Under a dean of women, responsible for employing women in accordance with standards of pay and conditions of employment applied by the employment division and for arranging transfers, promotions and similar personnel work among women employees. This department also promotes in the widest sense the well-being of all women employees, and the office of the dean of women is always available for consultation.

Employees' Service Division—Responsible for the administration of all company activities for furnishing personal services to employees, such as legal aid,

employee loans, group insurance, mutual benefit plans, co-operative buying and similar services.

Medical Department—Giving free medical advice to all employees and first aid treatment of any injuries that occur while on duty. Its physicians examine all prospective employees before acceptance and employees who have been ill before they resume work. This department co-operates with the Employees' Service Division in matters affecting the welfare of employees and the members of their families.

Education and Training

Training and Education Division—Furnishing employees with means of learning the company's business through lectures, classes and printed material; conducting visits to company plants; instructing correspondents in business letter writing, and equipping foreign-born employees with a knowledge of English and civics for good citizenship and helping them to obtain naturalization papers.

Safety Division—Supervising accident and fire prevention throughout the company, inspecting all properties for safety, conducting inter-departmental safety meetings and organizing and instructing classes in safety and first aid.

Employees' Representation Plan—Providing employees with the means of participating freely and fully in settling all company questions that directly concern them. Among these are questions of pay and hours, working conditions and every other matter that might possibly arise between employer and employee.

Savings and Investment Funds—Encouraging saving and thrift and giving employees an opportunity to invest in public utility securities on the partial payment plan. The funds are managed by trustees selected from employees.

Suggestion System—Previously explained.

Service Annuity System—Providing a yearly income for employees retiring after certain years of service.

Group Insurance and Christmas Presents.

A Splendid Summer Resort for Employees

A Summer Resort—Owned jointly by the gas company and two other utility companies, providing summer vacation facilities exclusively for employees, their families and friends. The property covers 235 acres, over 10,000 feet of which are lake frontage. Facilities include a large, modern hotel, cottages for light housekeeping, girls' cottages, camping spots, well-equipped boathouses, a bathing beach and a hall for dancing.

Post 336, American Legion—Made up exclusively of gas company employees. It keeps members informed on military matters, looks after the welfare of ex-service men in the company's employ and provides entertainment and recreation for them.

Company A, 108th Engineers, Illinois National Guard—Also formed entirely of gas company employees. Members are entitled to two weeks' leave of absence (in addition to their regular vacations), with full pay, while attending the annual encampment.

A library, a cafeteria and rest rooms.

The greatest single factor, perhaps, in the success of the Peoples Company's industrial relations effort is the Peoples Gas Club. This organization publishes the Peoples Gas Club News—the employees' house organ—and fosters social and entertainment features among its members. The officers are elected by the members themselves and the company exercises a minimum of administrative control over the club's operations. The annual election of officers and appointments of committee members are high spots of employee interest.

Miscellaneous Employee Activity

The club sponsors dances, stags, parties, athletics and a host of other usual club activities. The chief annual events are the picnic for club members and their families and the Christmas show for children. Both these affairs are produced in grand style by the committee members of the club.

There is a wide and lively interest among all employees in everything that the club does because they are doing the things themselves. The club idea has proved effective as a means of stimulating interest in what ordinarily would be industrial relations department activities by bringing those activities closer to the employees.

Employees can never be thoroughly taught that the company is their company and what it does they do. There is always that thought, subconscious or otherwise, that a company is a place to work. With the club it is different—they know it is solely for their enjoyment and belongs to them.

THE RESTLESS WORKER

Industry, seeking the leakage by which productive energy is dissipated, has come to the conclusion that the restlessness of American workers is costing the country something over a hundred million dollars annually.

Robert H. Spahr, in charge of the Employer-Employee Service of the Department of Manufacture of the Chamber of Commerce of the United States, sums up the situation by saying: "When we consider that the average turnover rate in American manufacturing for the first nine months of 1927 was approximately 42.3 per cent and the voluntary quit rate for September was around 38 per cent, the importance of this problem begins to dawn upon us. Considering this average rate, it means that approximately 4,000,000 separations of wage earners are occurring annually in American establishments alone and, of this number, two and three-quarters millions are voluntary quits.

"From studies including approximately 100,000 employees the average cost of turnover per man appeared as $59.62. If we use $50 as an average cost of turnover, we find that total separation cost the American manufacturers the staggering sum of $201,000,000 annually, and that voluntary quits alone, estimated on the same basis, amount to about $139,000,000."

"Can we afford," asks Mr. Spahr, "to ignore an industrial waste of this sort, a large part of which may be controllable?"

Keeping the Wheels Turning

By Don C. Murphy

Southern California Gas Company

EXECUTIVES are realizing more and more that a large fleet of vehicles, such as most utility companies use, should be in charge of one competent man, directly accountable to the management. At present the transportation system of the Southern California Gas Company is not a separate department of the organization. In those days before the phenomenal growth of this company started, most of the few machines used were in the distribution department. The superintendent of distribution directed the selection of new machines, the management of the garage and other general transportation matters, and as the number of cars were increased in all departments, they were naturally put under his supervision. Conditions now, with over four hundred machines in districts all over Southern California, make the present arrangement unsatisfactory, and the inauguration of a separate department for transportation is being considered.

Our transportation system has been motorized for some time. It was realized early in the motoring process that operation expenses could be minimized by using as few different makes of machines as practical. After many trials and a careful study of various costs, we have standardized three machines.

Choice of Trucks

Model T Fords comprise a large part of the fleet. Salesmen, special collectors, foremen and meter readers drive Ford roadsters; Ford touring cars transport field crews; and small Ford trucks serve for all light hauling. The Ford one-ton truck was tried for several years, but was abandoned because it proved impractical for our large territories. The gasoline consumption was almost as great, and the repair bill larger, for this truck than for one with a greater load capacity. Since doing away with the one-ton trucks we sometimes find it necessary to underload the next larger truck, one and one-half tons, or to overload the light truck. The latter alternative is preferable because the wear on the engine and tires caused by overloading is less than the excess cost of running an underloaded big truck.

The large trucks which we use, ranging from the one and one-half ton size, with pneumatic tires, to ten ton size, six wheel, solid tires, are used for transporting service crews, appliances, main gangs and storeroom supplies. The storeroom alone is operating fourteen trucks, which, besides hauling all supplies to district storerooms, distribute all the pipe for mains. The distance to the farthest storeroom is 395 miles. The storeroom trucks in 1927 strung 259.6 miles of main.

Several factors influenced our choice of a truck to be standardized:

(a) The machine is manufactured by a local factory, which proves convenient from the standpoint of getting parts quickly and of having the cars serviced or replaced when necessary.

(b) It was assembled of standard parts which might be obtained from many sources. When parts are needed for repair, it is only necessary to call any one of a number of dealers instead of sending to a distant factory or waiting for a local branch to secure stock.

(c) Trials and comparisons showed that the operation cost of this machine was smaller than that of trucks manufactured by Eastern concerns. The last comparison showed that a popular five-ton truck had an operating cost of nearly 20 per cent more than that of the trucks we were using.

Employees Are Skillful Drivers

It is not the practice of the Southern California Gas Company to employ special drivers for its machines, except for storeroom trucks. From experiment it has been found that most employees of the company are skillful drivers, using the same care with a company machine as they would with one of their own. It has been necessary to discharge very few men on account of reckless driving.

On the other hand, most employees, even though competent drivers, are not to be trusted with the complete care of a car. After a man has put in eight hours a day, working perhaps at top speed, he cannot be expected to spend another hour or so looking after the condition of his car. Also, few men, unless trained in mechanics, know just how much overhauling, lubricating or cleaning a car might require.

This company has, therefore, worked out a system whereby the responsibility for the care of a certain number of cars might be centralized in the hands of some one person. The driver is now responsible only for keeping the motor oil at the proper level, filling the gasoline tank and radiator, and keeping the tires inflated. As the organization is already divided into districts, a man has been appointed in each district to devote a part or all of his time to caring for the cars in that district. The number of machines in each district varies from four to twenty-eight, except in the central district, where there are about one hundred and fifty. In one district the night turn-on man, whose regular duties do not occupy all his time, looks after the twenty-eight cars, taking a few each night. In another district a meter setter's helper works two evenings a week to care for twelve machines. In the central district, where there are so many machines, it is necessary to have two men on duty every evening, caring for the lubri-

cation of the machines and the batteries. These men are a part of the regular night force at the main garage, which serves all the districts for general repairs.

Simple Monthly Lubrication Schedule

Men who lubricate are supplied with charts, giving careful instructions as to the lubrication of different makes of machines (Fig. 1). A simple

WINTLAND OILING INSTRUCTION SHEET.

Daily at the time the crank case oil level is checked.

a. Fan	grease cup or alemite	grease
b. Water pump	grease cup	"
c. Generator	oiler	oil

Steering	a. On steering gear	Oil plug	heavy oil
Distributor	a.	Oiler or grease cup	oil or grease
Front axle	a. Steering knuckle pin	4 alemites	grease
	b. Cross tie Rod	2 "	"
Front springs	a. Spring bolts	6 "	
Rear springs	a. " "	4 "	
Rear Axle	a. Wheel bearings	2 "	grease
	b. Spring shackles	4 "	
Radius Rods	a. Each end	4 "	
Drag link	a. " "	2 "	
Foot pedals	a. " pedal	2 "	
	b. Pedal brace clutch	1 "	
Universal joint	a. Spline fitting on rear shaft	1 "	
	b. Each cross	1 to 3 oil plugs	heavy oil
Centre drive shaft support	a. Bearing cap	1 alemite	grease
Brake assembly	a. Each end of shaft	4 "	"
	b. Pins	12 "	oil

The above is to be taken care of every two weeks and is to be called an "A" day.

On alternate weeks or on a "B" day the battery alone will have the gravity terminals and tightness checked and be filled with distilled water.

Approximately every 1,000 miles the crank case is to be drained and refilled. At the same time the transmission and rear axle should be checked. This is to be a "C" day, and so marked on the monthly chart, and also checked with a sticker on the speedometer.

When the speedometer shows a mileage which is a multiple of 2,500 the transmission and rear axle should both be drained and refilled. At the same time the front wheels should be cleaned out and repacked with grease. This is to be known as a "S" day and so marked on the monthly chart.

The air pressure of the tires on pneumatic tired trucks is to be checked each week and will be called a "T" operation and so marked on the monthly chart.

Note: Approximately 125 miles is to be considered a week's mileage.

Fig. 1a. Lubrication Instruction Chart

monthly schedule is used for keeping a check and record of this work (Fig. 2). From this schedule, which is made at the beginning of each month, the workman can tell which machines are to receive attention on any one day, and just what is to be done to each of them. Periodic duties, such as changing motor oil, greasing transmission and differential, greasing and checking front wheels, and testing the pressure of the pneumatic tires, are also noted on this schedule. During the month this record can show the district manager or general automobile inspector whether or not the work is being attended to, and it can be put aside at the end of the month as a record of what has been done.

Each of the larger districts has a garage with a regular mechanic, who does all the repair work except major overhauling. The mechanics work at night to avoid keeping the machines in the garage during working hours. Besides repair work, the mechanic grinds valves, changes rear ends, transmission bands and does all the tightening of steering gears, and loose bolts. Arrangements are made to have all machines pass through a district garage at least once a month for a general inspection, and a check of lubrication.

Work Done in Main Garage

In Los Angeles there is a main garage, to take care of the cars in the Central District, and in other districts too small to maintain a separate garage. In the main garage all general overhauling is done. This requires a force of mechanics, comprised of the day shift of foreman, four mechanics, two vulcanizers and two lathe men; and the night shift of six mechanics and two lubricators. The general overhauling can be taken care of by either shift. In connection with the main garage, we maintain a battery shop where two men charge, repair, rebuild and make batteries. Body building and painting are cared for in our regular carpenter shop and paint shop.

FORD OILING INSTRUCTION SHEET
WEEKLY OILING

Front end.	(a) Spindles	2 oilers	Oil
	(b) Spindle arms	2 "	"
	(c) Spring snackles	4 "	"
	(d) Reach rod sockets	(2)	"
	(e) Speedo swivel	1 " or grease cup	grease
	(f) Wish bone socket		oil
Under hood	a. Steering post	1 grease cup	grease
	b. Various advance levers		oil
	c. Commutator		"
Under floor boards	a. Hand brake	3 holes	"
		2 pins	"
		latch	"
	b. Universal	1 grease cup	grease
	c. Drive shaft	1 " "	"
Rear end.	a. Hand brake	2 oilers	oil
		2 pins	"
		2 brackets	"
	b. Spring shackles	4 oilers	"
	c. Axle bearings	2 grease cups	grease

The above is to receive attention every week and with the following is to be called an A day.

Rear end.	a. Check differential housing	heavy oil
	b. Oil spring leaves	use old engine oil.

On a B day to the regular weekly oiling is to be added.

a. Generator bearing	1 oiler	
b. Battery	check gravity, terminals, tightness & fill with distilled water.	

Approximately every 1,000 miles the crank case is to be drained and refilled and at that time the fan is also to be filled with heavy oil. This is to be called a "C" operation and is to be checked with a sticker on the speedometer and also marked on the monthly chart.

When the speedometer shows a mileage which is a multiple of 2500, the front wheels are to have their bearings and the wish bone and the reach rod sockets checked by the mechanic and refilled with grease. This is to be called a "S" operation and so marked on the monthly chart.

When the speedometer shows a mileage which is a multiple of 5,000 the speedometer cable should be removed and greased. The reduction gears in steering post hous should also be greased at this time. This is to be known as an "S" operation, and so marked on the monthly chart.

The air pressure of the tires is to be checked each week and will be called a "T" operation and so marked on the monthly chart.

Note: Approximately 250 miles is to be considered a week's mileage.

Fig. 1b. Lubrication Instruction Chart

Every three months the auditing department issues an itemized report of the cost of operating each machine. Each month a skeleton report is made showing the gasoline and oil consumption, and the total mileage and cost to date, but they do not record work performed on the machines, nor the drivers' record. To provide this information, a card of each machine is kept, on which is entered all repairs, monthly gas and oil costs, and the record of the tire

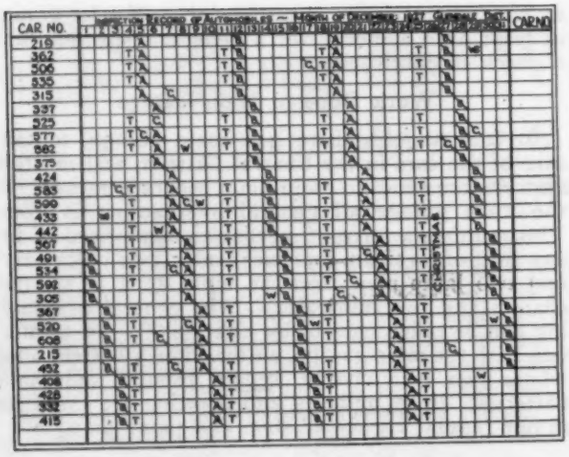


Fig. 2. Monthly Lubrication Schedule

changes and mileages of each driver (Fig. 3). By the use of these cards, major repairs and overhauling can be quickly and intelligently recommended on the basis of what has already been done during the life of the machine. These cards also serve as a check on the drivers. When repairs or tire costs are unusually high for machines of a certain driver, it can be assumed that the driver may be at fault rather than the machine.

Mileage Accounting Difficult

In a fleet of four hundred machines, running about four hundred thousand miles a month, it is difficult to give the management a satisfactory accounting of mileage. In districts varying from the apartment house districts of Los Angeles to the sparsely settled small farm areas, it is almost impossible to compare the mileage of two machines, even though they may be doing the same kind of work.

In order to ascertain if mileage can be reduced, the management is having a survey made of the com-

CAR NO. 597

Make: Ford Style: Roadster

REPAIRS

Date	Speedo Read	Work Done
10-6-27	27645	Installed new Bendix Spring
10-11-27	27855	Relined Transmission
10-15-27	28114	Ground Valves, new rings, new pistons, cleaned out carbon
10-27-27	28907	new Timer
11-4-27	29161	New Bendix Spring
11-5-27	29228	relined Transmission
11-19-27	30013	repaired Speedometer
11-22-27	30183	relined Transmission
12-7-27	31064	cleaned flex posts
12-19-27	31709	new Battery
12-21-27	31885	Ground Valves

REPAIRS

Date	Speedo Read	Work Done

CAR NO. 597 MOTOR NO.

Make: Ford Style: L. T.

Received

Monthly Mileage
Gas and Oil Record

Month	Miles	Gals. Gas	Miles Gal.	Pints Oil	Miles Pt.	Driver
Sept '27	1312	117	11.2	50	26.3	Walter
Oct '27	1596	149	10.7	42	37.9	"
Nov '27	1553	134	11.6	52	29.8	"

Mileage

Condition

TIRE RECORD

	ON Date	ON Speedo Read	ON R.F.	ON R.R.	ON L.F.	ON L.R.	ON Spare	OFF Date	OFF Speedo Read	OFF Mileage Rec'd	Condition
			552721					11-7-27	30013		blew out
	11-17-27	30013	782312								
			(Tire Numbers)								

Fig. 3. Drivers and Work Performed on Machine Record—Reverse and Obverse

pany's transportation system. To study the operation of the machines, an observer spends two days with each, keeping a record of its every movement. This record of mileage and movements shows whether the machine is being used to the best advantage. With an approximate estimation of the number of orders to be executed in each district, it is possible to determine how many machines each district requires and the mileage that each should run.

With salesmen, foremen, inspectors and others who do not have a definite number of orders to execute, it is difficult to say that mileage is excessive. To keep a better check on this type of driver, one district has devised a graph, which, because of its success, is being adopted in other districts (Fig. 4). These graphs are posted daily, and when the mileage of any one day, or month, shows an undue jump, the district manager has a reason for asking an explanation. The fact that the drivers know they will be called upon for such an explanation is no doubt responsible for the success of the graphs.

The survey, as now being made, aims not only to reduce the mileage, but to increase the efficiency of all departments affected by transportation.

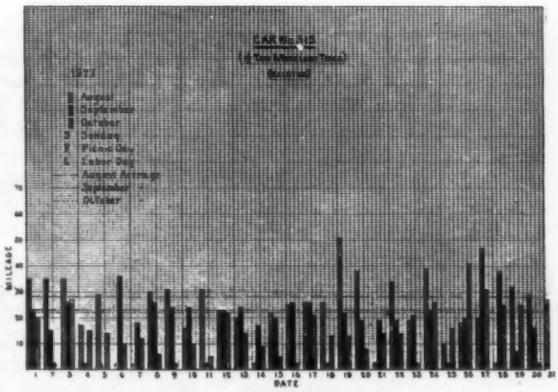


Fig. 4. Mileage Graph

The transportation system of the Southern California Gas Company, as it exists today, can no longer be classified as an adjunct to the distribution department. As the result of time, experience, new economic conditions and rapid growth, it has reached the place where it can be classified as an integral part of the company's operating structure and worthy of a separate department.

AN IMPORTANT LEGAL POINT

By W. F. Schaphorst.

Let us suppose that you buy a machine and find it unsatisfactory. It does not answer your purpose. You therefore notify the one from whom you bought the machine to take it away.

The question is: Have you the right to continue using the machine after you have rejected it?

The possibility of legal entanglement to a buyer of machinery or any other equipment under such conditions should prompt him to carefully read the sale contract.

It is a mistake not to read an important contract. In some instances, even after reading the contract, a buyer takes too much for granted. He possibly gets the idea that as he apparently has the advantage and feels that he may be able to "put something over" on the seller. Where this is attempted he sometimes encounters an important point that he had not expected and finds that it would have been better for him if he had taken the contract to mean exactly what it said. Contracts are usually so worded that anyone of ordinary intelligence can fully comprehend their meaning. As an illustration, here is a case that happened in one of the Western States:

A bought a piece of machinery from B. The contract allowed him to give it a tryout for a certain length of time to enable him to determine whether or not it would answer his purpose. At the expiration of this period, if it did or did not meet the requirements, he was to notify B in writing.

He gave the machine a trial and decided that it would not do. He notified B, but continued using the machine. Presently B called on him to pay for the machine, but A declined, saying that his notice as per contract that the machine would not answer his purpose released him from the contract and that he was not under any further obligation to pay.

B brought suit for collection. The courts held that A's continued use of the machine had rendered void the rejection clause in the contract and constituted his acceptance.

In the light of these facts, it is obvious that where a purchase is made with the right to reject after a trial, the buyer should be cautious in the use of such machinery after rejection. You may have no right to use it.

It is also obvious that in such a situation, if the buyer should for any reason desire to use the machine after rejection, he should get permission to do so from the seller, under another contract. Or he should be careful to have such permission written into the original contract before signing.

Even though the machine is unsatisfactory to a buyer, its temporary use after rejection is often absolutely necessary.

NEW ANTISEPTIC FROM GAS PLANT

Chemical research covering years has recently developed a new antiseptic of exceptional properties from coal-tar by-products of the South Staffordshire Gas Co., according to an announcement by Sir Alfred Mond, British economist.

The new antiseptic, which has been given the trade name of "Monsol," is said to be both non-irritant and non-poisonous. It can be applied to the skin, taken internally, or even injected into the blood, according to his announcement.

In addition to the new antiseptic, propylene and ethylene, two anesthetics, are also indirect products of the manufactured gas industry, and have been in use for a number of years.

Heat Transfer in Condensers

By W. K. Lewis

Professor of Chemical Engineering, Massachusetts Institute of Technology

ONE of the important heat transmission problems of the natural gasoline plant is the cooling of gases so rich in high boiling constituents that condensation occurs during the cooling process. In the past it has generally been assumed that this cooling takes place in two stages—the removal of the superheat, followed by further cooling accompanied by condensation. The first stage involved in general a relatively high temperature difference, but a low coefficient of heat transmission, whereas in the second stage the available temperature difference was low but the coefficient high. Furthermore, the total amount of heat removed in the first stage was small and in the second large. Under special conditions all this may be true, but very frequently it is not, as an analysis of the underlying factors ought to have shown us long ago.

NATURAL GAS TECHNIQUE GIVES IMPORTANT CONDENSING FACTORS

Reasoning from the technique of natural-gas gasoline plants, one can infer important fundamentals which must be observed in the cooling of any gas which is accompanied by condensing of a liquid. Manufactured-gas as well as natural-gas engineers can profit by a careful study of this paper by an eminent authority, which is published through the courtesy of the American Institute of Chemical Engineers, before which organization it was presented at the recent winter meeting.

Effect of Insulating Film

Consider the case of a highly superheated mixture of gas and condensable vapor traveling through a condenser tube, the outside of which is cooled with cold water. Under any normal conditions the thermal resistance between the water and the exterior surface of the tube is low and that of the tube itself even lower. Consequently the inner surface of the tube will be at a temperature very little above that of the cooling water. Now, on this inner wall of the tube there is a relatively stationary film of gas which insulates the wall itself from the main body of the gas. Through this film there is a temperature gradient, and the temperature of the gas in actual contact with the metal wall is that of the wall itself. Obviously, this wall temperature may very well be below the temperature of condensation of the gas, despite the fact that the main body of gas traveling through the pipe is far above its dew point. In such case, condensation will occur on the metal wall. This will coat the wall with a liquid film of condensate, which serves still further to insulate the gas from the cooling water. However, under many conditions, the resistance of this liquid film is low in comparison with that of the gas film, but whether this be true or not, condensation will occur and the liquid film will exist whenever conditions are such that the temperature of the inner surface of the pipe wall is below the dew point of the gas.

That this sort of thing occurs has recently been demonstrated experimentally by a number of investigations. Thus, in the determination in this laboratory of the coefficient of heat transmission between a mixture of air and steam and the metal wall of a pipe past which the mixture was flowing, the mixture had an original dew point of 180 degrees F., the temperature of the mixture even after cooling being, however, 40 degrees higher than this, namely, 220 degrees. The cooling water temperature was at no point over 120 degrees. However, there was realized a transmission coefficient over ten fold what one would anticipate in view of the pipe diameter and gas velocity. Furthermore, water was condensed in the pipe and a stream of liquid flowed from it.

Absorbed Heat Nearly Constant

Theoretical analysis of the problem shows that, in such case, if one plot the saturation curve with temperature as abscissae and humidity expressed as pounds of vapor per pound of dry condensable gas as ordinates, the path followed by the cooling and condensing gas-vapor mixture should be a straight line, provided conditions are such that the surface temperature of the liquid film on the pipe existing between the pipe and the gas be constant. It follows from this that the heat absorbed by the cooling medium from the gas per degree of temperature drop of the gas mixture as a whole is nearly, though not quite, constant throughout the range. In other words, conditions are not at all those ordinarily assumed. In the first place, condensation takes place from the start and not merely at the end of the process. Furthermore, the heat lost by the gas in the early stages of cooling is as great as that lost later. Finally, the gas as a whole never becomes saturated until condensation is substantially complete, although during the later stages of cooling it very closely approaches the saturated condition.

While it is plain that these conditions are never perfectly realized in the recovery plant, they are by no means hypothetical assumptions of no interest to the natural gasoline engineer. Thus, in the water-sprayed pipe coolers used in so many plants, the water on the exterior surface of the pipe is cooled to such a degree by atmospheric evaporation that these

conditions are at least approximate. It is true that during the early stages of cooling, while the gas is still hot, the water is relatively hot also. However, this is a point at which the temperature difference is large and if the cooling water temperature be assumed constant at a value equal to that at the cold end of the cooler, the error in determining the overall temperature difference is not serious. Furthermore, even allowing for the higher temperature of the water at the hot end, pipe wall temperature at that point is likely to be below the dew point of the gas and condensation therefore starts in at a very early stage of cooling. It can easily be shown that, granting the conditions outlined in the preceding paragraph, the average effective temperature difference between cooling water and gas in such a cooler is the logarithmic mean of the temperature differences at the two ends of the unit. There can be no doubt but that the use of the logarithmic mean in this case, employing the actual temperature differences at the two ends, is a far more dependable method of estimating heat transmission coefficients than the assumptions hitherto employed.

An Important Point

It is important to keep a second point in mind. The heat transmitted through the gas film is only the sensible heat of the gas and does not include the heat of condensation of the vapor. The reason for this is that the vapor travels through the gas film to the liquid layer on the surface of the pipe by diffusion in the vapor state, actual condensation occurring on the surface of the liquid film. Therefore the heat of condensation is liberated inside the gas film and hence does not have to travel through it. If now, one grant that the thermal resistances of water film on the outside of the cooling surface, of the metal wall and of the liquid film on the inside are all negligible in comparison with that of the gas film, it follows that one should calculate the heat transmission on the assumption that the sensible heat only of the gas is given up. It is true that the heat of condensation may be far greater in amount than the sensible heat of the gas, but it takes care of itself, because there would be inappreciable thermal resistance between the point where it is liberated and the point where it is absorbed in the cooling medium. This does not mean that one can neglect this heat of condensation in calculating the amount of the cooling medium, but only in calculating the necessary surface for heat transmission by the use of the gas film conductivity coefficient. One must also keep in mind the fact that the sensible heat of the vapor is largely conducted through the gas film. Since condensation is linear with temperature drop, it follows that half of the sensible heat of the vapor condensed goes through the gas film by pure conduction. However, in the hotter parts of the system, the vapor diffusion through the film to a degree carries its sensible heat with it. It is probably a satisfactory approximation to assume that the heat thus carried is half the remainder, i.e., that the heat to be removed by pure conduction is three-fourths of the sensible heat of the vapor.

So long as condensation is occurring, the thickness of the liquid film and therefore its thermal conductivity does not vary much with the amount of the condensation, because this thickness is determined by the readiness with which the condensate drains off the surface down to the lowest point of the pipe. Thus it is found that for given conditions of cooling water temperature, pipe size and gas velocity, a gas condensing, roughly, fifteen gallons per thousand, will require double the condensing surface of a far leaner gas producing only a little condensate. Now the fifteen gallons of condensate will weigh approximately 75 pounds and have a specific heat of about 0.6, or a heat capacity of 45 B.t.u. per degree. Granting that three-fourths of this must be transmitted through the gas film by conduction, this means 34 B.t.u. per degree of cooling. Now the non-condensable gas is 1000/380 = 2.63 lb. mols. This gas will, in general, have a heat capacity of from 12 to 15 B.t.u. per lb. mol., or 31 to 40 B.t.u. per degree of cooling. In other words, that part of the sensible heat of the condensate which must be conducted through the gas film just about equals the sensible heat of the gas itself and therefore doubles the heat transmission load on the apparatus. However, the heat of condensation of the liquid would be at least equal to the sum of the sensible heat of both gas and vapor. Were this included, it would double the apparent overall coefficient of heat transmission.

It is entirely possible to cool and condense a gas-vapor mixture by the mechanism ordinarily assumed. Thus, if in the early stages of cooling one employ a cooling medium not too much lower in temperature than the gas, i.e., above its dew point, no condensation will occur until saturation is reached. Once the gas is saturated, further cooling tends to keep it on the saturation line. When cooling a hot gas with a cold medium, the condensate is formed at a low temperature and from a cold gas, despite the fact that the body of the gas as a whole is hot. Consequently the high boiling constituents tend to condense preferentially to a greater degree than when the cooling medium employed is higher in temperature, i.e., the condensate contains less dissolved low-boiling components. This is because the differences in relative volatility of components of different boiling points increase at lower temperatures. Thus, all of these factors operate in favor of lower temperature of the cooling medium.

Influence on Liquid Friction

Another important factor the significance of which in recovery operations is often overlooked, is the influence of heat transmission on liquid friction, i.e., on the pressure drop through pipes and conduits. If one determines the pressure drop through an oil heater, one finds that the friction is considerably less than one would be led to anticipate from the ordinary formulas, even though the temperature be averaged carefully both longitudinally and radially. Conversely, in an oil cooler, the friction drop is high. Furthermore, this error can amount to over 100 per cent, i.e., in an oil cooler the pressure may be double what one would anticipate from the ordinary formulas, even allowing for the temperature change as indicated above. This is particularly true if, as is so often the case, conditions are such that the motion of the liquid in the pipe is viscous in character.

The explanation of these phenomena is undoubtedly the following: If a liquid flowing through a pipe is being heated, the film of liquid immediately adjacent to the pipe wall is the hottest part of the whole fluid. Owing to its high temperature its viscosity is a minimum. Now this film is an exceedingly important factor in determining the friction of the fluid as a whole. Owing to its low viscosity, it serves in a sense as a lubricant to eliminate friction between the core of fluid flowing through the middle of the pipe and the pipe wall. Consequently, the pressure drop is abnormally low. Similarly, if the oil is being cooled, this surface layer is excessively viscous and since, per unit radial thickness, this layer transmits more oil than any other, the pressure drop becomes correspondingly high. This laboratory is working on a theoretical study of the problem and hopes to be able to present a workable engineering solution in the not too distant future. In the meanwhile the factor is one which the designing engineer must not ignore.

The Heat Required for Coal Distillation

How heat balance is determined

By L. Litinsky

THE coke oven has remained up to the present time a mere empirical apparatus just like most metallurgical ovens. The time of coking varies quite appreciably with the type of oven employed, and lasts either fifteen days or sixteen hours, according to whether the primitive beehive coke oven or the most modern by-product coke oven is employed. There are at the present time more than one hundred different systems of coke ovens and they can all yield a good quality coke, irrespective of the time it takes to carry out the coking operation in them.

The heat which is required to distill coal is made up of four parts as follows:

1. The quantity of heat which is required for the distillation process proper. In accordance with the work done by Rau (see Stahl und Eisen, 1910) it is not necessary to add any external heat to the coal distilling operation, for the evolution of gas out of the coal is an exothermic reaction, that is a reaction which is accompanied by the development of heat. This also agrees with the tests made by Hilgenstock. Experiments have shown that the quantity of heat, which is required in the oven itself for the distillation of one ton (short ton 2,000 lbs.) is qual to 1,800,000 B.t.u. in round numbers. On the other hand, it is also established that 1,656,000 B.t.u. are absorbed by the coke and the distillation gases, so that only 144,000 B.t.u. per ton remain to take care of the losses by radiation. This is undoubtedly too little and furthermore it does not agree with the figures that were obtained by Euchene (see Comptes Rendus du Congres Internationale de l' Industrie du Gaz, Paris, September, 1909).

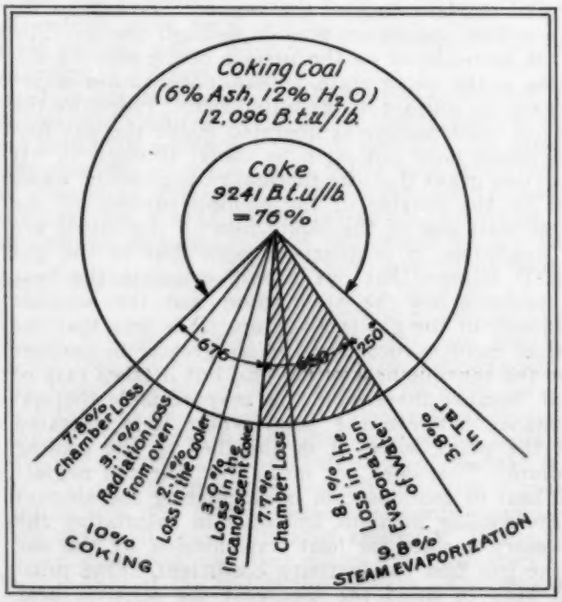


Fig. 1. Distribution of Heat in Operation of Coke Oven, 76% Coke Yield from Coal, Based on Coking Coal, 12,096 B.t.u. per Pound

2. The heat that is carried away by the distillation gases and by the steam.

3. The heat which is contained in the incandescent coke itself, and

4. The residual heat, which is lost through radiation.

From 1,080,000 to 1,440,000 B.t.u. in round numbers are required for the processes designated above.

This is a chapter in a new book just published by L. Litinsky under the title of Coke and Gas Works Ovens.

It is, however, also necessary to add thereto the heat which is carried away in the combustion gases which pass through the recuperators. It may therefore be figured that from 1,620,000 to 1,980,000 B.t.u. and more will be required for the distillation of one short ton of coal according to the system of oven used and the properties of the coal.

Graphic Representation

Various data is available on the heat balance of the coal distillation process. Some of this data is based on the heating value of the coal and some on the quantity of heat, assumed to be standard, which is required for the distillation of the coal. The recalculation of the consumption of heat, that is, from the heating value basis to the consumption of heat in distillation and vice versa, is very readily accomplished. Heat balances of this character are graphically represented in the illustrations that accompany this article.

Thus the heat balance which is shown in figure 1 refers to the distribution of heat in coke oven operation when a coal is used that yields 76 per cent coke and has a heating value of 12,096 B.t.u./lb. (For further details on this balance see Schreiber, Preparations, Briquetting and Coking of Coal, Brunswick, 1914, F. Vieweg & Sohn, page 65.)

Figure 2 shows the heat distribution of a coking process in which waste heat ovens are employed. The coal has a thermal value of 12,974 B.t.u. per lb. and the yield of coke is 79.51 per cent. The gas has a thermal value of 2,290 B.t.u. per lb. of coal and its yield is 17.68 per cent.

Figure 3 shows the distribution of heat in coke oven operation with recuperators. The thermal value of the coal is 13,080 B.t.u. per lb., that of the coke produced at a 74.94 per cent yield 9,800 B.t.u. per lb. of coal. The heat in the gas is 2,820 B.t.u. per lb. of coal, and this amounts to 21.54 per cent of the coal used.

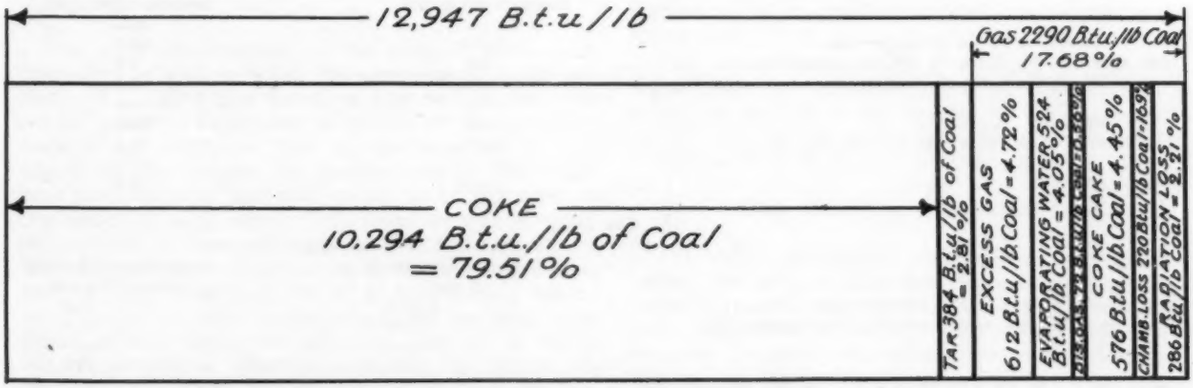


Fig. 2. Distribution of Heat, in Coke Oven Operation, in Waste Heat Oven

Figure 4 shows the distribution of heat in a heat balance made on a Koppers coke oven and is based on the quantity of heat required for coking. The upper portion of the figure refers to a recuperative coke oven and the lower portion to a waste heat coke oven.

In accordance with the investigations made by Carl Otto, the heat consumption in the distillation of one pound of wet coal is distributed as follows:

1. In the waste heat oven at a final temperature of 1,742 degrees F., 1,279 B.t.u.
2. In the recuperative oven at a final temperature of 1,670 degrees F., 1,230 B.t.u.
3. In the recuperative oven at a final temperature of 1,550 degrees F., 117 B.t.u.

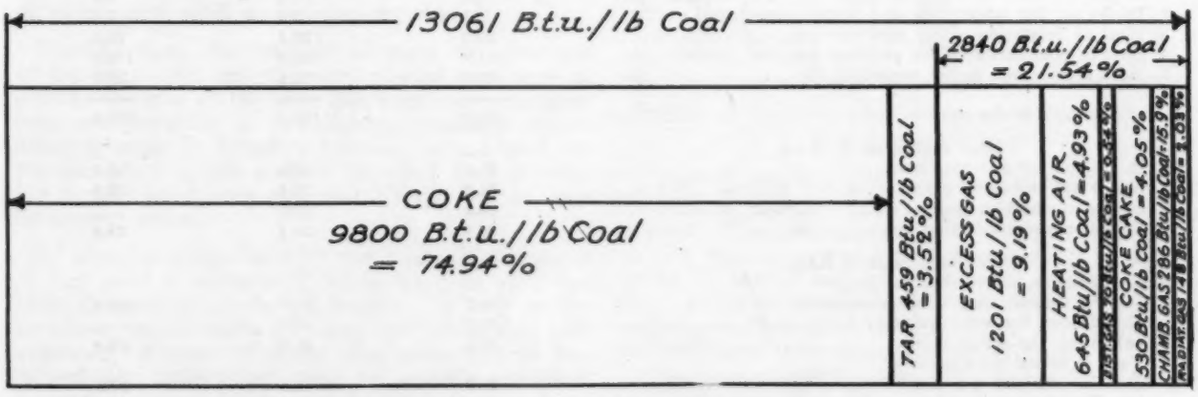


Fig. 3. Distribution of Heat in Coke Oven Operation, Regenerative

The heat of coking is composed in the following manner:

	Experiment number 1. 1,742 deg. F. B.t.u. / lb.	Experiment number 2. 1,670 deg. F. B.t.u. / lb.	Experiment number 3. 1,550 deg. F. B.t.u. / lb.
(a) In the coke	540	468	425
(b) In the water vapor	174	174	174
(c) In the tarry vapors and gas	90	90	90
(d) For the dry distillation	475	499	494

The heat balance of a retort furnace with built-in producers is given below in three separate parts as follows: (a) the producer, (b) the oven, and (c) the recuperation.

HEAT BALANCE OF A RETORT OVEN WITH PRODUCER

(a) The Producer or Generator

	Heat: Based on one pound of coal.	Heat: Per cent of heat on heating value of the coal.
Heat of formation of the producer gas	3,570	24.4
Heat added, in the form of air for underfiring	561	3.9
Heat added, in the form of steam	119	0.8
Total heat	4,250	29.1
Heat content of producer gas at 1,832 deg. F.	3,410	23.4
Loss in producer	840	5.8

(b) The Oven.

	Heat: Based on one pound of coal.		Percentage of heating value of the coal.	
Heat of combustion of the producer gas		11,010		75.6
Heat loss in the hot waste gases at 1,832 degrees F.		7,540		51.8
		3,470		23.8
Added thereto is the sensible heat of the hot producer gas at	3,410		23.4	
1,852 degrees F. and of the hot air at 1,472 degrees F.	1,935	5,345	13.3	36.7
Heat given up to the chamber		8,815		60.5

(c) The Recuperation

	Heat: Based on one pound of coal.		Percentage of heating value of the coal.	
Heat content of the flue gases at the entrance		7,540		51.8
Heat content of the flue gases at the exit		3,035		20.8
Heat yield up in recuperation		4,515		31.0
Heat recovered through preliminary heating—				
Of the top air	1,935		13.3	
Of the air used in underfiring	561		3.9	
Of the steam	114		0.8	
Through production of steam	615	3,225	4.2	22.2
Loss through conduction and radiation in recuperation		1,290		8.8

The following is a heat balance in a vertical retort oven. Three different installations are indicated in this tabulation.

Heat added in B.t.u.	B.t.u. per cubic foot of producer gas—No. 1.	No. 2.	No. 3.
1. In the hot coke in the producer	8.5	8.8	8.8
2. In the air for underfiring and steam, regenerated	7.5	5.5	7.0
3. Heat of formation of the producer gas	20.0	32.4	20.0
4. Heat of combustion of the producer gas	131.0	122.0	136.0
5. Heat regenerated in the secondary air	26.6	30.4	26.8
Available in the oven	193.6	199.1	198.6
Heat subtracted in B.t.u.			
6. In the gas, tar and gas liquor	21.0	18.6	18.6
7. In the hot, not-burnt coke	31.2	28.6	28.9
8. In the combustion gases	70.3	86.6	....
9. Radiation and conduction losses	96.6	56.2	39.8
Various heats in B.t.u.			
10. Containing in the combustion gases—			
(a) At the entrance to the recuperator	70.3	86.6	100.3
(b) Before the water valve	52.3	70.9	....
(c) After the water valve	40.3	52.0	53.8
11. Used in actual distillation—			
(a) Gas, tar and gas liquor	20.0	18.5	17.9
(b) Hot, not-burnt, coke	31.2	28.6	28.9
(c) Hot, ignited coke	8.5	8.8	8.8

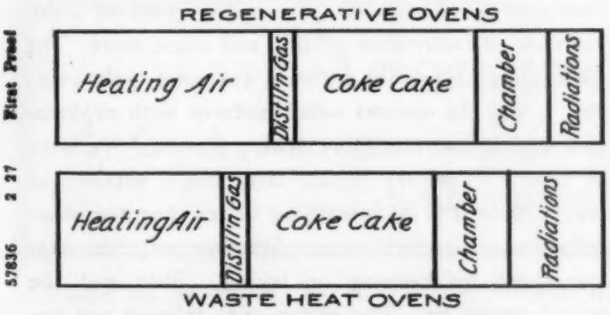


Fig. 4. Distribution of Heat—Koppers Oven

The heat consumption of the oven in coke oven operation is seldom given in percentage of the gas yield. On the other hand, in gas works the heat consumption is expressed in terms of the so-called underfiring coefficient, that is, the quantity of coke consumed per pound of gasified coal. Thus the heat consumption amounts to 13 to 15 per cent in the underfiring of vertical chamber ovens, 16 to 18 per cent in the case of horizontal retort ovens, etc. The data on underfiring as obtained from the literature is very confused, for it is not always stated whether or not the figures are based on pure coke (coke minus water and ash) or coke as it comes out of the ovens. Furthermore, the figures on underfiring are given at one time based on the per unit volume of gas made and another time on the per unit weight of coal used. In all these cases it is seldom that information is found on the water and ash contents of the coal as well as on the character of the coal, and on the other hand, on the character of the process used in quenching the coke, either wet or dry in retort ovens, etc. There is also a lot of confusion as to whether or not the coke used in underfiring is made from the same coal used in making gas, or whether another coke is employed.

Required Heat Varies With Oxgen Content

Coals with a high oxygen content, that is, young coals, require different amounts of heat in the dry distillation process than coals with lower oxygen contents. For the same reason it is often highly desirable to have the composition of the coal given in connection with underfiring figures.

Furthermore, the relation between the strength of the used coke and the kind of coal employed as well as the size of the coke particles must be taken into consideration in establishing standard underfiring figures. It therefore follows that a highly important point is the manner in which the underfiring figures have been obtained. This may be done in several ways.

It may be determined by the number of charges of fuel used in underfiring, after the coke yield has been determined in the laboratory. It may be determined by difference by using the tonnage of coke available for sale. Finally, the coke that is employed for underfiring may be actually weighed, its water content determined by laboratory analysis, etc. Differences of as much as five per cent based on the coal weight may be obtained by using these three methods.

It must also be determined whether the data on fuel consumed in underfiring the ovens is more advantageously given in terms of heat units per heat unit in the distilled coal or per heat unit in the produced gas, or in percentage of the pure coal consumption per unit of gasified carbon and the water contained in it or per unit of carbon contained in the gas. The author has found it best to base the underfiring figures on the unit weight of raw coal, the figures being given in terms of heat units. He found that when this was done it was possible to compare gas-making installations in much better fashion as far as underfiring fuel consumptions were concerned.

The author carried out a number of tests along these lines on various systems of coke ovens, and while he published the results of his investigation in the journal, Das Gas und Wasserfach, 1924, he is giving here a resume of these studies.

Data Based on a Standard Coal

The daily production of the oven was given in cubic feet of gas (all the original figures are in terms of metric units but have been converted here into English units.—Ed.) at a temperature of 59 degrees F. and atmospheric pressure (760 millimeters) in the moist state. Data on the duration of the time the material remained in the chambers and on the cubical volume of the coal are based on a standard coal which was used for comparative purposes and which did not contain more than two per cent water and ten per cent ash.

The yield of gas was given in terms of cubic foot per ton of pure coal at a temperature of 32 degrees

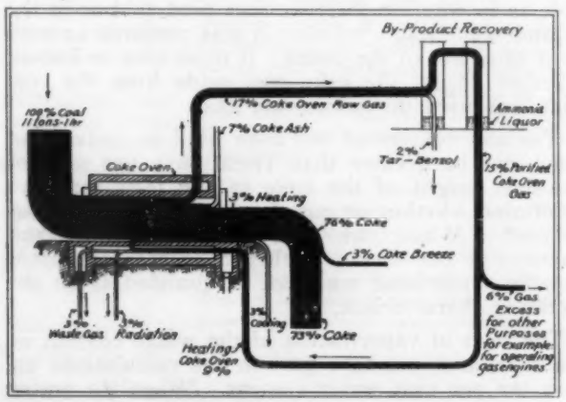


Fig. 5. Heat Economy of a Coke Oven

F. and atmospheric pressure, and the corresponding maximum heating value of the gas was also recorded. The heating value of the gas was given as the maximum value at a temperature of 32 degrees F. and atmospheric pressure, the gas being dry. In those cases where a certain guaranteed gas output was indicated, the gas yields were also given as compared with this guaranteed yield.

The content of incombustible ingredients in the gas was given and must not be greater than twelve per cent of combined carbon dioxide and nitrogen.

As far as the underfiring is concerned, the consumption of fuel for this purpose was given in terms of heat units, which were required for a technically complete degasification of unit weight of the coal, one pound (one kilogram in the original). The heat consumption was more advantageously expressed in the case of ovens with individual generators in terms of unit weight, one kilogram, of the dry coke as it comes out of the chamber or retort. The heating value of the pure coke is assumed to be equal to 14,310 B.t.u. per pound in calculating the weighed amount of coke consumed in terms of heat units. The coke that is added to the generator less the picked-up coke of commercial value which can still be recovered, for example, over 0.8 inch in size, is taken as the consumption of coke.

When a central generator is employed or other kinds of gas used in underfiring the ovens the consumption of heat is measured in cubic feet of heating gas and the minimum heating value of this gas is determined. In case coke is used in the central generator, it is also recommended that the consumption of coke be given in terms of pounds of pure coke.

The underfiring figures were based on a crude coal of not more than two per cent water content. When the coal contains a higher proportion of water, an extra 1,080 B.t.u. per pound is indicated. This was later increased to 1,800 B.t.u. per pound.

The gas yield per ton of coal and the consumption of fuel in underfiring per ton of coal have been given above. The ratio of the underfiring to the gas yield is determinative for the fulfillment of the guarantee with simultaneous exceeding of the gas yield and the underfiring consumption.

The character of the coal used in underfiring must also be noted. First the information must be available as to whether the coke was used cold or in the incandescent stage, whether it was prepared or used as it came out of the ovens. It must also be known whether or not the coke was made from the coal that was used in making the gas.

The ash content of the coke used in underfiring must not be greater than twenty-five per cent of the dry weight of the coke in the tests made to determine whether or not the guarantees are being fulfilled. When the coke contains more than twenty-five per cent ash, then a greater consumption for underfiring must not be qualified as an objectional characteristic.

The heat of vaporization of the water content of the coke does not take part in the calculations up to a ten per cent water content. When the water content is greater than this, then the heat consumption may be considered increased by 1,080 B.t.u. per pound of water (afterwards increased to 1,800 B.t.u.).

SPEAKING OF GOOD ADVERTISING—WHEN WE DO, WE KNOW SALES RESULT

A prominent automobile manufacturer has a habit of advertising: "When better automobiles are made, ——— will make them." Gas appliance makers could emulate that advertisement. But, here is one used by the Public Service Company of Colorado and it really does all that and some more. The illustration shows the satisfied customer, sale point No. 1, and the various small pictures with explanation which add five more selling points. We used to hear: "Try, try again, boy, you'll succeed at last." Now it is do something better than the other fellow and you will win. We can only do that something by keeping on trying. Stop and the crowd passes us. The better sales talk—if not impregnated with misstatements—is doing something better than the other fellow. Anyway, this advertisement will help any salesman to see the value of a good gas range and to instill a liking for his article and help him to state its merit.

Association Activities

A. G. A. and affiliated gas associations' sectional activities and convention calendar

Natural Gas Department Plans for Dallas Convention

The Natural Gas Department of the American Gas Association will hold its annual convention and exhibition at the Texas Fairgrounds in this city May 7, 8, 9 and 10. The exhibition will be in the Manufacturers Building, and the meetings will be held in the Fair Park Auditorium.

A record breaking meeting and exhibition are expected, according to the convention call issued by N. C. McGowen, of Shreveport, La., chairman of the Natural Gas Department. This is the first annual meeting of the natural gas men since the recent amalgamation with the A. G. A.

Intensive preparations for the convention are underway. Dallas is anxious to eclipse all past meetings, and the Lone Star city is making every effort to outdo Cincinnati, where the famous 1927 convention was held.

The exhibition committee of the department, through its chairman, H. L. Montgomery, of Bartlesville, Okla., has announced that more space will be available for exhibits than in the past, and that present indications point to not only a larger number of exhibitors, but also a much larger amount of space occupied by the manufacturers.

The members of the exhibition committee, working under Mr. Montgomery, are C. C. Cartwright, Ft. Worth, Texas; T. C. Clifford, Pittsburgh, Pa.; H. N. Greis, Tulsa, Okla.; E. F. Schmidt, Dallas, Texas, and H. L. Whitelaw, New York, N. Y.

Coincident with the intensive preparations and plans being made for the exhibition are the activities of those in charge of the other important features of the convention.

The Committee on Papers, under the chairmanship of L. K. Langdon, Cincinnati, Ohio, has asked all natural gas men to submit their suggestions for the program of the meeting. Every natural gas man is being urged to suggest topics and speakers.

The other members of this committee are John H. Maxon, Muncie, Ind., and Frank L. Chase, Dallas, Texas.

The Committee on Arrangements consists of H. C. Morris, Dallas, Texas, chairman; Fred M. Lege, Jr., Dallas, Texas, and Charles B. McKinney, Houston, Texas.

CONVENTION CALENDAR

March

13-14 Oklahoma Utilities Association. Annual meeting. Tulsa, Okla. E. F. McKay, Oklahoma City, Okla., manager.

14-15 Illinois Gas Association. Annual meeting. Springfield, Ill. R. V. Prather, 305 Illinois Mine Workers Building, Springfield, Ill. secretary.

April

4-5 Eastern States Gas Conference, Newark, N. J. J. Calhoun Smith, Consumers Gas Co., Reading, Pa., secretary and treasurer.

10-11 Pennsylvania Gas Association. Annual meeting, York, Pa. Geo. L. Cullen, Harrisburg, secretary.

12-13 Women's Section, Empire State Gas & Electric Association. Annual meeting, Briarcliff Lodge, Briarcliff Manor, N. Y. C. H. B. Chapin, Grand Central Terminal, New York, N. Y., secretary.

12-13 Distribution Conference of Technical Section, A. G. A., Chicago, Ill., Stevens Hotel.

17-19 Southern Gas Association. Annual meeting, Jacksonville, Fla. J. P. Connolly, 141 Meeting Street, Charleston, S. C., secretary.

18-20 Midwest Gas Association. Annual meeting, Cornhusker Hotel, Lincoln, Neb. A. W. Schmidt. Des Moines Gas Co., Des Moines, Iowa, secretary.

19-20 Gas Section, Empire State Gas & Electric Association. Annual meeting, Briarcliff Lodge, Briarcliff Manor, N. Y.

May

2-5 Southwestern Public Service Association. Annual meeting, Dallas, Texas. E. N. Willis, 403 Slaughter Building, Dallas, Texas, secretary.

6-11 Natural Gas Department, American Gas Association. Annual meeting, Texas State Fair Grounds, Dallas, Texas.

10-11 Accounting Section, Empire State Gas & Electric Association. Annual meeting, Briarcliff Lodge, Briarcliff Manor, N. Y.

June

21-22 Canadian Gas Association. Annual meeting, Hamilton, Ont. G. W. Allen, 7 Astley Avenue, Toronto, secretary.

Twenty-two Thousand Square Feet of Exhibit Space At Dallas

The exhibition of equipment and appliances to be held in conjunction with the annual convention of the Natural Gas Department of the American Gas Association at Dallas, Texas, May 7 to 10, will be one of the largest, if not the largest, ever held by the natural gas industry, according to announcement just made by N. C. McGowen, chairman of the department.

Present indications point to a larger exhibition than was held last year at the Cincinnati meeting, when 22,000 square feet of space were used, says Mr. McGowen. Advance inquiries made by manufacturers regarding space in the exhibit reveal the intense interest being shown.

"All manufacturers of equipment and appliances were especially interested when Dallas was chosen as the meeting place," says Mr. McGowen. "Plant extensions now being made at a record rate in the Southwest will tend to attract the equipment companies, while the intensive building development of the territory is one of the main attractions for the appliance people. It is also expected that manufacturers of industrial equipment will take advantage of the opportunity to exhibit in the center of the Southwest's great natural gas development."

The exhibition prospectus has been mailed to manufacturer companies. This prospectus gives the cost of booths, requirements, gas and electricity facilities, and all details. Manufacturers are requested to place their orders for space promptly, to avoid disappointment.

Plans for Distribution Conference

Each year has seen a notable growth in the enthusiasm with which the distribution engineer has anticipated the discussion of his particular problems at the annual Distribution Conference of the A. G. A. and the Fifth Annual Conference, to be held at the Hotel Stevens, Chicago, Ill., April 12-13, will be no exception.

M. I. Mix, chairman of the distribution committee, has announced an exhaustive list of topics for discussion at

the conference, covering every phase of the broad field included in the distribution of gas service, and the program which the committee is preparing will afford the engineers a splendid opportunity for the full and complete discussion of the problems confronting them today. The following outline indicates that the distribution engineer will obtain from the conference valuable information of real service.

J. K. Crowell, chairman of the sub-committee on pipe coatings and corrosion, will submit a report on the latest developments, including progress of committees of the American Petroleum Institute and the Bureau of Standards, which are also studying this subject.

O. S. Hagerman has completed the organization of a standing committee on pipe joints that will cover every type of joint for both cast iron, wrought iron and steel pipe. It is expected that the committee will have available for the conference a paper on a welded line of special interest that has just been completed. A paper is also in preparation indicating the experience of the natural gas men on pipe joints in connection with high pressure transmission of gas. Test work in contemplation on cast iron pipe joints may possibly be sufficiently advanced to warrant a report.

J. H. Braine, of the Brooklyn Union Gas Company, will have available a very comprehensive report on portable distribution equipment. In connection with this M. F. Reeder, of the Peoples Gas Light & Coke Co., will present a brief statement as chairman of the accounting section committee on cost of operating motors and mechanical equipment in distribution work.

Arrangements have been made for a paper on the use of bar connections on meters by E. S. Umstead of the Providence Gas Company. The general subject of meters—domestic and industrial—will be handled by the sub-committee on this subject, of which George A. Lane of Chicago has accepted the chairmanship.

A paper by R. G. Griswold, of H. L. Doherty & Co., entitled "Life of Pipe," will be discussed.

The subject of automatic devices for raising pressures at district governors, etc., will probably be treated by E. H. Enander, of the Public Service Company of Northern Illinois. Long distance high pressure transmission of gas is the subject assigned to F. A. Lydecker, of the Public Service Electric & Gas Co., and chairman of the sub-committee on Long Distance High Pressure Transmission of Gas. The work of this committee will eventually be contributed as a part of the report of the committee making an economic and engineering survey of the gas industry.

Developments in dehydration of gas will be presented from the distribution engineer's standpoint, and an attempt will be made to cover briefly all that has been accomplished on this very important subject.

There will be an Open Forum, a feature which has always proved a popular one, and members are urged to bring up their problems for discussion.

Arrangements have also been made for a brief progress report and the results of the research in mixed gases at the A. G. A. Laboratory. Saturday morning will be devoted to an inspection trip to the Gary plant of the National Tube Company.

During the current month a letter will be forwarded to company members, including manufacturer company members, interested in distribution work which will outline fully the program for the conference, hotel rates, etc.

Sales Theme Features New England Meeting

THE Second Annual Meeting of the New England Gas Association, held last month at Boston, was attended by upwards of six hundred representative gas men and was concerned, for the most part, with the selling of gas and appliances.

In his address President Wm. Gould held that selling is a profession and speculated as to whether our sales departments are properly equipped as regards its personnel. He also brought out that we are entering an era of rate making and, in this connection, it is debatable whether we have the proper rate to get our share of the water heating business.

Discounts and deposits should be carefully studied, he maintained, and if these stand in the way of getting business they should be revamped.

"The real goal," said Mr. Gould, "is not buying appliances but getting them out on the mains."

Mr. Gould approved of the various social activities of the gas company and endorsed the thought that salesmen should be assisted in making more money.

In concluding, he hoped that the New England Gas Association would arrange for a training school for salesmen.

Forward Praises Association

Major Forward thanked the New England Gas Association for its co-operation with the A. G. A., and drew attention to what various New England gas men have contributed to the industry and to the general happiness of the American public.

He declared that the A. G. A. is big because its problems are bigger and more numerous than ever before. In this connection he warned that we must be careful that the bigger things are better things.

He said that individualism is by no means submerged merely because an undertaking is big and, to the contrary, individual effort in the larger group is valued more highly than ever before.

"If there are any evils in the bigger things," reassured Major Forward, "we will find a solution for them."

Touching upon the subject of research, he pointed out what the A. G. A. is doing for industrial gas, mixed gas study, natural gas, commercial matters, rate making, etc.

"The research of today," he said, "is but a drop in the bucket to the research of tomorrow."

He expressed gratification for the increasing interest of the women in gas matters, which he included under the heading of research also.

Much enthusiasm attended the presentation of the Governor's Cups by Mr. M. B. Webber, the Greenwich Gas Company carrying off the first four prizes.

He announced that a fifth cup will be awarded this year, the same to be given for the greatest increase in domestic output per meter as compared to 1927.

In his paper, "House Heating Developments and Tendencies," Mr. D. S. Reynolds, of the Boston Consolidated Gas Company, outlined the practice pursued by his company in getting house heating business. He quoted various figures and data showing how radiation and gas needs are calculated. In this connection he stated that the installed radiation is always checked, even though the existing coal installation might be giving complete satisfaction. He advised that all installations are made by heating contractors. The boilers are inspected at regular intervals and maintained gratis by the gas company.

Address by Fogg

The address "'Sales Allies," by Oscar H. Fogg, president of the American Gas Association, contained suggestions and information of much value. He spoke of the changing conditions in the domestic market and called attention to the fact that goods are being produced in greater volume than they can be consumed.

He further indicated that there is a scramble for the consumer's dollar, and America has become a bedlam of selling bordering on hysteria.

He stated that a casual survey will show that there is a slower rate of domestic growth than in any other field of gas utilization.

He alluded to the condition whereby the path of the dollar is lined with an infinite number of attractions and "that part of the dollar that we feel is ours will not seek us."

"Are we lacking in sales outlets?" he asked, and then went on to enumerate the preponderance of outlets in favor of our chief competitor. In some cases this is six to one, he brought out.

Commenting to the effect that our objective can only be reached through merchandising, either by ourselves or others, he inquired as to what is to be done to get outlets for gas appliances. In this connection he stated that we have made good progress with the heating and allied trades, and the plumber. But he drew attention to the fact that while there is a lot of talk being indulged in there is little being done to follow up the various plans.

He advised that we tactfully cooperate with and advise the sellers of inferior gas appliances to the end that better appliances will be sold.

Mr. Fogg heartily endorsed the Blue Star Plan, and in concluding asked that the industry speed up its merchandising plan, which he declared should be reconstructed. He felt hopeful that the various problems attending merchandising could be worked out and that other appliance outlets would be fostered. "We must first decide whether we need these sales allies," he contended, "and then plan an unified sales policy."

Paper by Hayward

H. W. Hayward, director Research Institute, Combustion Utilities Corporation, in his paper, "Industrial Gas Developments," said that there is a difference, in many cases, in the viewpoint of the industrial gas man and the management. He suggested management cooperation, research in equipment, rate study, research in utilization, service study, and study of territory as means for attaining the goal of maximum output for industrial gas.

He stated that electricity has become a big competitor, due to its more carefully prepared sales talk.

Referring to the matter of rates, he said that a complete survey might lead to a readjustment of rates, and that a rate, to be sound, must be based on a customer, demand and commodity charge.

Mr. Hayward spoke of the need for salesmen who could close orders as well as the proper type of sales managers.

Col. E. S. Dickey, manager, Maryland Meter Works, delivered a stimulating address on "Opportunities."

He said that our opportunities, which are limitless, are not only an obligation but also a necessity, if we are to get a large volume of gas sales. Further, the salesman must present his story cleanly to the public.

Col. Dickey brought out that while transportation and education have gone a great way toward offsetting the enormous increase in production, the latter is fast outstripping demand. Also, salesmen have almost gotten back to be "order takers" and high pressure selling has added to the general turmoil.

"Salesmen Are Not Born"

"We do not want order takers in the gas business," he said. "We must have salesmen who know their business." He further averred that the gas salesman must present the dignity and quality of the organization's product. In addition, the salesman must be an executive of the highest order.

"Salesmen are not born," contended Col. Dickey. Accordingly, he stated that a good salesman would have made a good lawyer or doctor.

He made a plea for bigger and better advertising and said that the gas story must be repeatedly hammered into the public. "The gas company must sell confidence to promote good-will, which is intangible like our product," he advised.

He brought out that good-will must be built on sane lines of constructive action and that we cannot and must not fool any of the people any of the time.

Referring to the politician, he counselled that if we give good service we will gain the friendship of the public, and finally the politician will not fight public opinion.

The executive also came in for some good advice, being admonished by Col. Dickey to sell his own personality to the public at every opportunity.

Reed and Barnum Talk on Interesting Subjects

"Promotional Rates," a paper read by C. S. Reed, rate expert, American Gas Association, brought out that optional rates do not benefit the customers as a whole, and the quick break rate fails to minimize the loss, due to changing habits of our customers. He said the great disadvantage of the quick break rate is that it must be installed at a gamble.

A service charge, said Mr. Reed, readily permits the customer to grow up into a bigger user of gas.

Dana D. Barnum, president, Boston Consolidated Gas Company, delivered a meaty and enlightening address, "A Few European Observations," in which he outlined European gas practice.

Due to the fact that oil is high in price the scheme is to use as little as possible, consequently the B.t.u.'s are lower than in this country.

He spoke of the idea being to produce a coke suitable to the needs of each community.

As against recuperation, waste heat boilers are one of the biggest developments abroad, Mr. Barnum stated.

One very interesting observation had to do with the fact that considerable research work in gas production is being done in Germany.

He told of how barring down is obviated in Germany by the use of water-cooled jackets on the water gas sets.

In England the steam from waste heat boilers, in many plants, is sufficient to supply the entire power for running the works.

From the standpoint of distribution, Mr. Barnum mentioned the use of rubber gaskets in France. These have been taken from the ground, after a number of years' use, and are found to be elastic. He also said that European engineers face the same problem of leakage that we encounter in this country.

As to sales, he stated that many companies rent appliances, and in Birmingham industrial gas is widely used. Further, there is an excellent experimental laboratory in this city. In France the sales per meter are low.

Mr. Warren Stiles was elected president for the coming year.

A. G. A. Plays Important Part in Master Plumbers' Institute

The American Gas Association played an important part in the first annual three-day institute of the New York State Association of Master Plumbers, held at the College of Engineering of the New York University, January 23 to 25, 1928. This institute was held by the State Association of Master Plumbers in conjunction with the University and consisted of a number of important addresses on topics of vital interest to the master plumber.

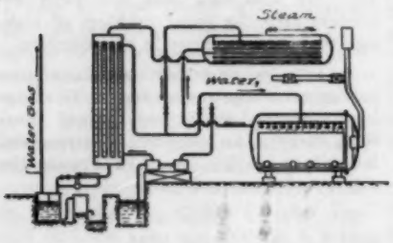
Every day, between the hours of 12 and 2.15 there were individual sessions, during which time the subjects of refrigeration by gas, house heating by gas and large volume water heating were discussed by association representatives. The attendance at the institute was approximately 160 and the interest displayed keen. The methods of cooperation between the master plumbers and the gas companies were discussed and the advantages of closer cooperation explained.

The exhibit was in charge of Mr. A. M. Apmann and Mr. A. Rathemacher.

Technical and General MISCELLANY for The Busy Gas Man

HIGH TEMPERATURE DISTILLATION

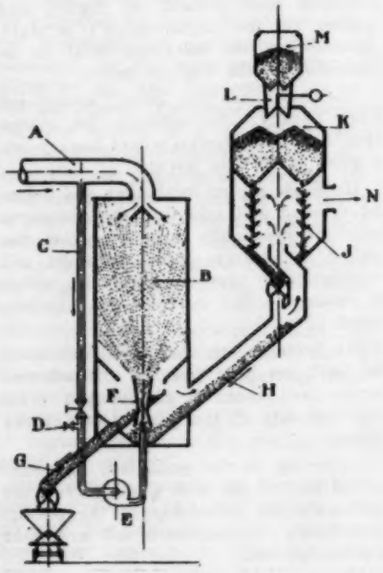
A very interesting article has appeared in Journal des Usines a Gaz, 1927, pages 499 to 514, written by M. A. Baril, which reviews the important developments in this field since the year 1926. The work done on the mechanism of the high temperature distillation process is included in this study, particularly attention being paid to the investigations on the swelling or tumefaction of the coal as it is heated to various temperatures.



Such developments as the Bamag process in which the heat of the incandescent coke is utilized, as is shown in the accompanying illustration, by quenching it with water in the closed quencher, shown at the bottom to the extreme right of the illustration, figure 1, and the steam and water gas evolved passes into the boiler and then into the reheater.

A portion of this article is also concerned with water gas. Various processes, such as the Fischer process and the Patart process, are studied from the standpoint of their internal mechanism and stoichiometric calculation.

Purification also receives treatment and one of the interesting developments discussed is the Raffloer process for the continuous dry absorption of sulphuretted hydrogen from gas. The apparatus used is shown in figure 2. The principle of the process is simply to make the gas come into contact with finely pulverized iron hydroxide which is sprayed as dust from the bottom to the top of a tower. The gas is blown into the tower through the blower E, passing through the ejecting device F, and carrying with it the iron hydroxide which falls down the chute H. The gas passes through the tower B and out at A, and a part of it also passes up the chute H and reaches the central portion of the hopper arrangement K, from which it escapes only after passing through the stream of oxide that falls down from the storage container K. The gas leaves by N.



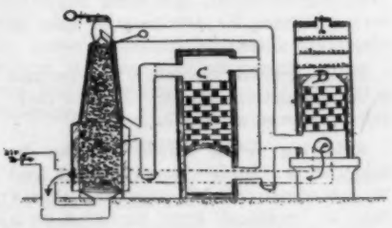
RAPIDITY OF COMBUSTION OF COKE

Inasmuch as the rapidity of the combustion of coke determines the heat which is developed in a unit of time in the most favorable case, it is important in any heating operation. The combustion of coal is divided into preliminary combustion and main combustion. The first corresponds to the gasification of the coal, and the second to the combustion of the coke. The rapidity of a process is determined by the slowest partial operation in that process and in this case it is determined by the combustion of the coke.

The coke, which is being investigated, is heated in a quartz tube in an electric furnace up to a temperature of 600 degrees C. The particles of coke are from two to four millimeters in size and the depth of the layer is three centimeters. A current of air is blown through the coke and the sum, carbon dioxide and carbon monoxide, is determined in the waste gases for different speeds of air. If x denotes the rapidity of the gas in cubic meters per minute, h the height of the coke layer, and d the cross-sectional surface area in square meters, then the linear gas speed through the empty tube is equal to d/x centimeters per minute; the duration of contact is $t = 60d.\ h/x.\ s.$ The factor given by the tube causes a constant error, for the reason that the coke filling of the tube is not taken into consideration in this study. Nevertheless, the relative magnitudes are comparable with one another. The quantity of carbon dioxide and carbon monoxide is shown in a curve in the original article as a function of the duration of contact. In one case the curve showed a sharp break which corresponded to the maximum admissible air velocity. This rises with the speed of combustion of the coke. Eight different samples were studied. G. O. B. a. Brandis and J. W. Le Nobel, Het Gas, volume 47, pages 250ff., 1927.

KREISA COMPLETE GASIFICATION SYSTEM

The accompanying illustration shows the Kresia complete gasification system. The lower part of the gas making apparatus, A, is designated as a producer or generator, and the upper portion B is called the vertical retort. The first superheater is placed alongside the gas-producing apparatus at C. This is made in the usual cylindrical form and is filled with suitable checker brickwork. The latter is made in special form so that the tar which accompanies the distillation gases from the retort B is subjected to pyrogeneous decomposition in this apparatus. A second superheater is located at D and this is provided at the top with a water vaporizer which serves to superheat the steam required for water gas manufacture. The lower portion is filled with checker brick. The water to be converted into steam is atomized by means of suitable atomizers. It is vaporized by coming in contact with heated metallic plates located in the bottom of the apparatus D and superheated in the lower part of the apparatus. Steam is thus produced without the consumption of fuel directly for



this purpose and it constitutes a regulator of the production of gas. At the end of the gasifying period, when the water will no longer vaporize, it collects in a chamber at the bottom of the superheater D and a float valve makes electrical contact with a signalling device.

The cycles in the apparatus vary in accordance with the capacity of the set, the nature of the fuel used and the quality of the gas produced. Three minutes of blasting and seven minutes in the make run are generally satisfactory. At the time of blasting the carbonized fuel (coke) occupies the lower portion of the producer and is heated up to a state of incandescence by primary air which enters under the grate. The hot blow gases containing carbon monoxide do not enter the retort but pass into the superheater, where they are mixed with secondary air, which converts the monoxide into dioxide. Then they pass into the secondary superheater and then into the stack.

Water is introduced into the top of the superheater D and steam is produced which is led into the generator to produce water gas. The water gas passes through the retort B and distills the coal there. The mixture of water gas and coal gas escapes at the top of the retort B and the tar in the gas is cracked by passing through the superheater C. The cracked tar serves to raise the calorific power of the gas. At the end of the gasifying or make period, the coke formed in the retort is allowed to drop into the generator, after the ash has been removed and this is then heated in the blow run and the cycle is repeated. Le Gaz et L' Electricite, 1927, pages 89-91.

GAS CUTS ENAMELLING COST

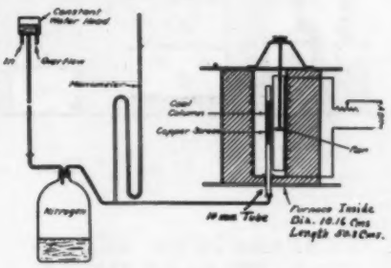
Gas is being used now in the fusion of an enamel coating to metals. Excellent results have been obtained in this field and where a careful analysis is made of all the costs involved it has been found that there is an actual saving with gas as compared with coal fuel. Such an installation is described by W. A. Smith in the Ceramic Age, December, 1927, pages 201-3.

Three types of gas-fired enamelling furnaces are described as being used in this plant, namely, the intermittent, semi-muffle and full-muffle. The manner of the operation of these furnaces, the heat recuperative features, etc., are also described. The methods used in making the cost tests are discussed and the results given in tabular form.

An analysis of these results shows that when gas costs $0.52 per thousand cubic feet (B.t.u. value not given), the cost of operating a 4 x 10 foot furnace was $77.41 per day of 22 working hours, or the cost of applying a single coat to the metal was $0.0088 per square foot. In the case of coal, the cost per day amounted to $79.76, or $0.0091 per square foot of single coat burnt. There was thus a saving of $2.35 in favor of gas, or $587.50 annually. This does not, of course, take into consideration the conveniences of using gaseous fuel and other advantages.

DIFFERENTIAL INDEX FOR COKING POWER OF COAL

A graphical means for determining an index number, called the agglutinating index, for any coal has been developed by the use of the softening and solidification point test. The relative magnitude of this agglutinating index and the distribution of the area beneath the time dp/dt curve indicates the manner in which coking energy and agglutinating power is distributed in the coal. The state of weathering through which the coal has passed may be determined by the value of the agglutinating index.



The test is carried out in the apparatus shown in the accompanying illustration. A furnace is used for heating the coal, a constant-head device for supplying a constant flow of nitrogen through the coal mass, a manometer and a pyrometer for measuring the temperature developed in the furnace. The constant flow of nitrogen is secured by displacing the gas from a large bottle by allowing water to flow by gravity from a constant head into this bottle. The manometer is attached to the line leading from the bottle to the furnace and the regularity of the flow of gas can be easily determined by watching the movement of the columns of liquid in the manometer tubes. The increase in pressure under these conditions, that is absolutely uniform flow of nitrogen, is brought about by the softening of the coal. The pressure then increases until a maximum is reached and then decreases rapidly and finally reaches the normal pressure. These pressure variations are noted on the manometer.

It is shown in this article that the agglutinating power of coal is a function of the rate of heating to which it has been subjected, the conditioning to which it has been subjected, the weathering through which it has passed, and the chemical interactions that take place during plasticity. The tests show that in order for a coal to give good results in coking operations it must have an agglutinating index of 20 or more. A. W. Coffman and T. E. Layng, Industrial and Engineering Chemistry, 1928, pages 165-170.

REMOVING SULPHURETTED HYDROGEN FROM COKE OVEN GAS

Sulphuretted hydrogen is removed from coke oven gas by a wet purifying process which depends on the use of a very thin aqueous sludge of ferric hydroxide. The process is similar to the Koppers process in this respect, but differs from the latter in that the ammonia that is recovered from the coke oven gas itself is employed to obtain the necessary alkalinity for accelerated transfer of the sulphuretted hydrogen from the coke oven gas to the ferric hydroxide with the resulting formation of ferric sulphide. No soda is used in this process, which is known as the GFK wet purification process.

The washer is of the ordinary cylindrical type. The gas enters this apparatus at the bottom and leaves it at the top. The iron sulphide liquor, which collects at the bottom of the washer, is removed from it by means of a centrifugal pump and is pumped into the oxidizer. This apparatus is made in the form of a cylindrical column or tower whose height is very large as compared with its diameter. It widens out into a cylindrical portion at the top into what is known as sulphur separator.

Before the iron sulphide liquor enters the oxidizing tower it is mixed with compressed air. The latter is introduced at a proper point in the pipeline that leads from the centrifugal pump to the oxidizing tower. The amount of air required to effect the oxidization of the iron sulphide with the precipitation of sulphur and the conversion of the iron back into the hydroxide is three parts of air per hundred parts of gas treated. The height of the oxidizing tower gives the mixture of air and iron sulphide liquor a long path to travel so that sufficient time is afforded for the reaction to take place to completion.

The mixture of air and liquid thus rises in the tower to its very top and the precipitated sulphur, which floats

on top of the liquor, is finally separated from the latter in the top portion of the tower, which is called the separator. The regenerated liquor is then allowed to flow back into the gas scrubber through an overflow line. The thick froth of precipitated sulphur floating on top of the liquor in the sulphur separator is removed into a sulphur tank, from which batches of sulphur are removed periodically, washed in centrifuges and disposed of in suitable ways. The spent air that passes out of the sulphur separator along with the sulphur into the sulphur storage tank is removed from that tank into another tank where the sulphuric acid content of the air is made to react with a solution of ammonia that is obtained from the ammonia washers in the gas plant. The air is then allowed to escape into the open, and the sulphate of ammonia which is formed in this manner is worked up further and sold.

It is pointed out that the success of this process depends on the basic discovery that sulphur under properly controlled conditions will float on the liquor in the oxidizing tower in concentrated form. This makes it possible to circulate the scrubbing liquor continuously through the apparatus. W. Glured and R. Schoenfelder, Chemical & Metallurgical Engineering, volume 34, pages 742-743.

MAKING MIXED WATER GAS AND COAL GAS

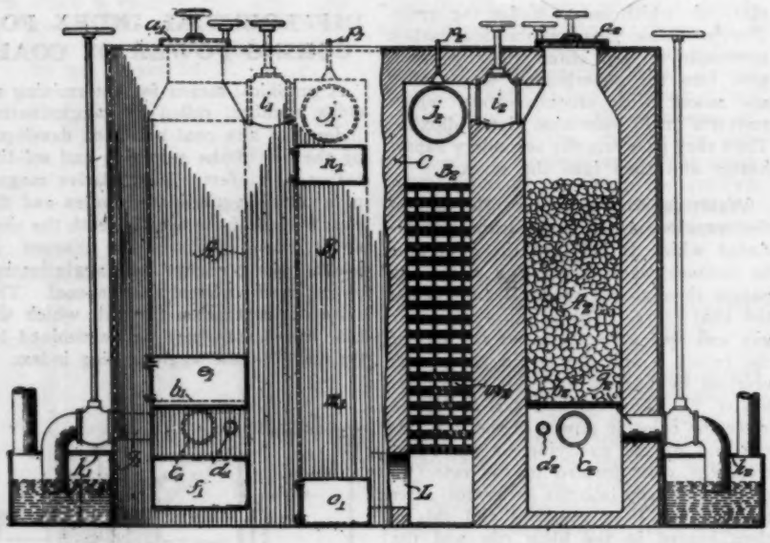
The new process of making mixed water and coal gas in a complete gasification operation seeks to accomplish the latter with the least possible dissipation of heat and with a minimum of manipulation of the gas producing materials. The process is carried out in apparatus as shown in the accompanying illustration.

The apparatus consists of two gas generators, A_1 and A_2, which may be enclosed in a common casing or constructed independently in the usual cylindrical form. The generators are provided with similar working parts, a_1 and a_2 being the charging doors in the top of each generator for introduction of coal, b_1 and b_2 the grates which support the body of fuel, c_1 and c_2 the valve controlled inlets for the admission of air, d_1 and d_2 the valve controlled steam inlets, e_1 and e_2 the clinkering doors, and f_1 the ash removal door. The valve controlled gas outlets are shown at g_1 and g_2, and the wash boxes are indicated at h_1 and h_2.

Passages i_1 and i_2 connect each of the generators with an intermediate combustion chamber or superheater. This chamber is divided by a centrally located partition C into two similar superheaters B_1 and B_2. The superheaters are provided with the usual gas outlet at the top and checker brickwork filling.

In starting the operation one of the generators, A_1, is partially filled with coke and the other generator is filled to the top. After combustion has been started in A_1 bituminous coal or the like is fed into it and the other generator is operated to make water gas. This water gas is led through the superheater B_2 and becomes highly heated, and it is then passed into the generator A_1 where it acts to distill the volatile matter out of the coal, and these vapors in passing down through the incandescent coke portion of the generator are split to form permanent gases. Thus a mixed coal and water gas is produced. The operation is now reversed and the fuel in A_1 is blasted, that is, after it has finally been coked, and the blast gases are used to heat the superheaters. Water gas is then manufactured in A_2 and this gas is treated in the same fashion as above.

The feature of the invention is that there is no heating through walls, but all the heat applied is heat generated by a combustion of the fuel itself brought into contact with the material to be heated by a current of gas. W. D. Wilcox, United States Patent No. 1,652,386.



TEMPERATURE REDUCTION OF FLUE GASES IN STACKS

Formulae are developed and examples are given of the calculation of the temperature reduction of flue gases in stacks. It is shown that this reduction is very important from the standpoint of the draft in the boilers. The developed formula shows that the decrease is principally dependent on the dimensions of the chimney, the speed of the gases as they left the top of the stack and the heat conductivity coefficient of the material from which the stack is constructed.

The figures which are given in the following tabulation apply to a chimney which is about 100 feet high. They clearly show how the temperature reduction varies with the rapidity of the flow of flue gases and with change in the coefficient of heat conductivity.—L. Possner, Die Waerme, 1927, pages 883-4.

Temperature Loss Per Meter Height in Degrees C.

Speed in meters per second of gases leaving chimney.	Coefficient of heat conductivity of material of chimney				
	1.0	1.25	1.5	1.75	2.0
5	0.53	0.66	0.78	0.90	1.02
6	0.44	0.55	0.65	0.76	0.86
7	0.38	0.47	0.56	0.65	0.74
8	0.33	0.41	0.49	0.57	0.65
9	0.30	0.37	0.44	0.51	0.58
10	0.27	0.33	0.40	0.46	0.53
11	0.24	0.30	0.36	0.42	0.48
12	0.22	0.28	0.33	0.39	0.44

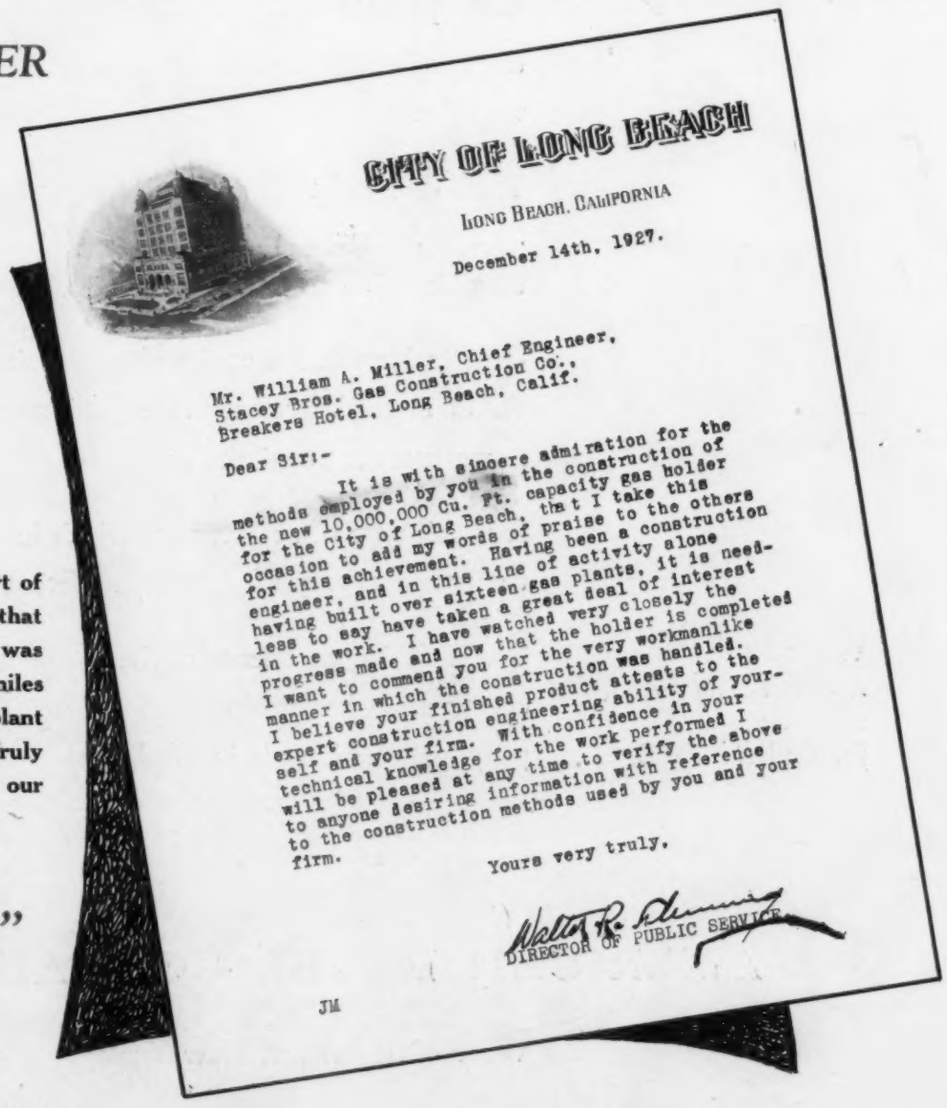
AN ACHIEVEMENT UNEQUALLED!

Our contract called for the completion of the ten million cubic foot gas holder and foundation with 17-foot excavation for Long Beach, California, in eight months. ALL OF THE WORK WAS FINISHED AND GAS TURNED ON IN SEVEN MONTHS.

Contract Awarded—May 5, 1927.
Excavation commenced—May 6, 1927.
Excavation completed—May 28, 1927.
Erection of Steelwork begun—June 13, 1927.
Erection of Steelwork Finished—November 28, 1927.

December 6th, 1927, holder entirely completed, including three coats of paint, retaining wall and back fill.

THIS LETTER SPEAKS FOR ITSELF



CITY OF LONG BEACH

LONG BEACH, CALIFORNIA

December 14th, 1927.

Mr. William A. Miller, Chief Engineer,
Stacey Bros. Gas Construction Co.,
Breakers Hotel, Long Beach, Calif.

Dear Sir:-

It is with sincere admiration for the methods employed by you in the construction of the new 10,000,000 Cu. Ft. capacity gas holder for the City of Long Beach, that I take this occasion to add my words of praise to the others for this achievement. Having been a construction engineer, and in this line of activity alone having built over sixteen gas plants, it is needless to say have taken a great deal of interest in the work. I have watched very closely the progress made and now that the holder is completed I want to commend you for the very workmanlike manner in which the construction was handled. I believe your finished product attests to the expert construction engineering ability of yourself and your firm. With confidence in your technical knowledge for the work performed I will be pleased at any time to verify the above to anyone desiring information with reference to the construction methods used by you and your firm.

Yours very truly,

Walter R. Summers
DIRECTOR OF PUBLIC SERVICE

JM

The remarkable part of this achievement is that all the steelwork was brought over 3,000 miles from the fabricating plant in Cincinnati, Ohio. Truly a supreme test of our

"ABILITY TO SERVE"

STACEY BROTHERS GAS CONSTRUCTION CO.

NEW YORK: 75 West Street — CINCINNATI, OHIO — BOSTON: Eastern Service Co.

A New Achievement in Meter Value!

ONCE AGAIN a factory of the American Meter Company has made a noteworthy contribution to the complete and flexible service which we offer.

The 250-B and 500-B Iron case Meters—announced by the Metric Metal Works—will prove to be of tangible value to industrial service.

Greatly increased capacity obtained simultaneously with a marked decrease in weight is an achievement in measurement engineering.

It is this type of achievement which has established the true economy of American Meters.

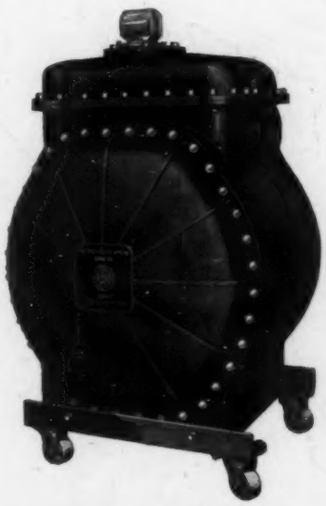
Write to
Metric Metal Works,
Erie, Pa.,
for Bulletin 300-B.

The unfailing confidence of the Gas Industry in the constructive leadership of American Meter Company factories is again justified.

AMERICAN METER COMPANY
Incorporated

105 West 40th Street, New York

Announcing an Addition to Regular Ironcase Meters



500-B with truck for shop handling

These meters have been designed and manufactured especially for measurement of gas used in industrial service. They are of two sizes: the 250-B, having a capacity of 5000 cu. ft. per hour; the 500-B, having a capacity of 10,000 cu. ft. per hour—based on 2" differential and .6 gravity gas.

Replacing 100-B and 200-B Ironcase Meter of our regular line

METERS

Lighter in weight and greater in capacity

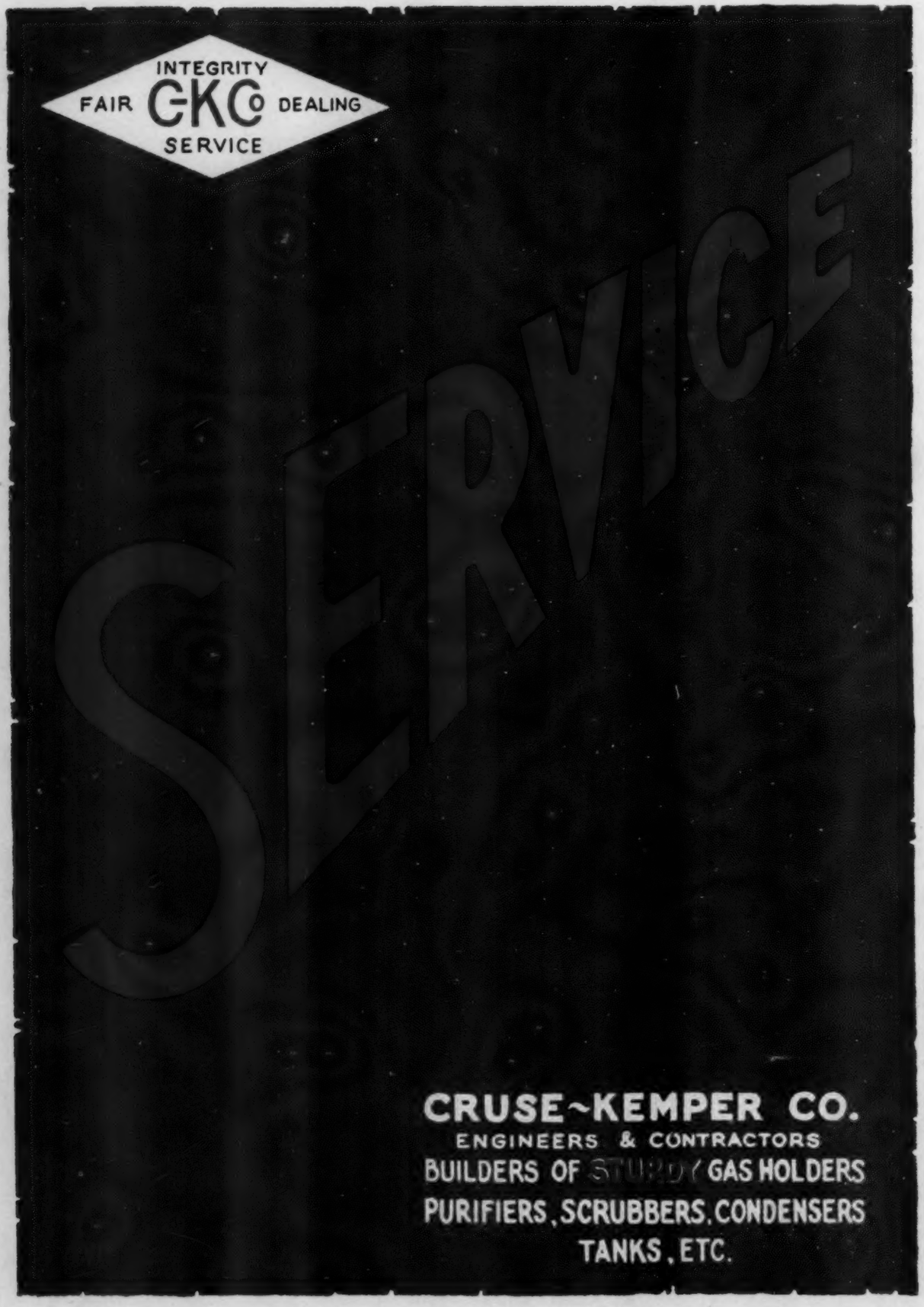
The valve construction has been improved and Timken bearings used in the crank step, crank stand and flag steps.

Alemite lubrication to all main bearings—applied from outside of case and while meter is in operation.

Glover Type Slide valves and diaphragms.

METRIC METAL WORKS
of the American Meter Company, Inc.
ERIE · PENNSYLVANIA · U-S-A

WRITE FOR BULLETIN 300-B


INTEGRITY
FAIR CKCo DEALING
SERVICE
SERVICE
CRUSE~KEMPER CO.
ENGINEERS & CONTRACTORS
BUILDERS OF STURDY GAS HOLDERS
PURIFIERS, SCRUBBERS, CONDENSERS
TANKS, ETC.

THE AWAKENING

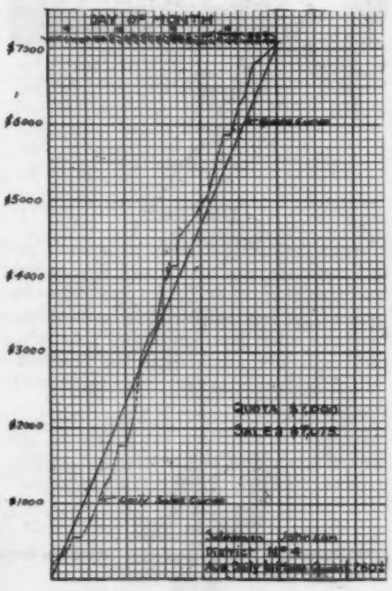
MORE and more public service companies are following the lead of the Consolidated Gas & Electric Co., Baltimore, the Peoples Gas Stores, Chicago, the Commonwealth Edison Electric Co., of the same city, and the Laclede Gas Light Co., St. Louis, in displaying and selling "related" or "kindred" merchandise. After all has been said about the engineering mind dominating the gas industry, here and there we see evidences of the realization on the part of the engineer and financier that modern merchandising methods and merchandisers will have to sell the service and commodity produced by both gas and electric companies.

DON'T DODGE ORDERS

There is a diversity of opinion regarding the home service worker's duties. Some say she should not sell merchandise, while others feel that she should. There's a topic for discussion. In our opinion, the home service worker in the larger company probably will be kept working overtime if she attends strictly to home service problems. In the smaller one we are inclined to think that the home service worker should not dodge an order, and in both instances we are of the opinion that the home service workers should know their gas appliances.

CURVES

Curves are always interesting, and here's one that may be of interest to some salesmanager. Plot a straight line curve of each of the quotas set for your salesmen; figure out the amount of business he must produce each working day to meet this quota and pin this chart, along with one of a like character for your total month's quota, on the bulletin board in the sales room. Then watch the effect it and the plotting of actual results from day to day will have on sales.



STORE ON WHEELS

Taking gas appliances to the customer's home is not an altogether new idea, but it is a very good one, and while several companies have employed this method of reaching their customers and demonstrating the various appliances offered for sale, to our knowledge the most successful store on wheels is that used by William F. Eve, sales manager of the Gas Light Company of Augusta, Ga. The truck which was designed by Mr. Eve has proved of unusual interest and has been the means of introducing and selling a large volume of merchandise in at least a dozen Southern cities. The Augusta Chronicle has this to say about the idea: "The novel departure in merchandising gas appliances, including ranges, water heaters and gas heating equipment is meeting with unusual comment throughout the city where it has been seen. The demostration truck is of special body design, so constructed as to properly display the home labor saving appliances in a manner that heretofore was impossible unless the customer visited the company's store."

The plan of the company is to carry the gas show room right to the home of the customer. The truck is accompanied by a crew of neatly dressed salesmen, who call at customers' homes and invite them to the exhibit. Newspaper advertising is liberally used to acquaint folks of the car's arrival in the city and to advise them to be on the lookout for its visit to their neighborhood.

A SALES HELP

Here's a new one: A Western gas man is giving an allowance of 10 per cent of the purchase price of a new range when an old range is turned in by the customer and applying that 10 per cent to the contract as the first payment.

THE WEARING OF THE GREEN

How's color hitting it off in your town? Tangerine, red-hot red, bilious blue, potato brown and two-tones seem to be giving way to green, pea, apple and plain green. Green shades get the eye and home managers say, "I can use green with what I have and not buy a complete new kitchen. Some look upon red as a hot color and—well, others like it—so there you are.

ARE YOU TRYING TO SELL LAUNDRY EQUIPMENT?

We have heard a lot of chatter regarding the loss in gas send-out caused by the exploitation work done by the laundry and laundry associations. Just what has this loss amounted to? Has anyone any figures on how much gas equipment is laying idle in the homes of the country, how many laundry stoves, gas heated washers, ironers and laundry dryers? As one gas man said the other day, "I think this laundry advertisement has been a big aid in selling home laundry equipment, for up to a few years ago I do not know of but one or two gas companies that were making any effort to sell laundry equipment, and they were in the big cities." And may we ask how many gas companies are really putting out any effort now to sell home laundry equipment?

GETTING HIS GOAT

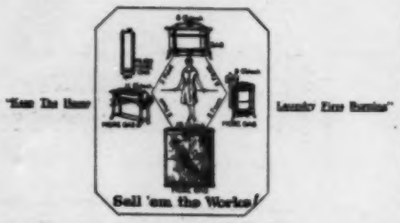
"There is one type of salesman who gets my angora," said a sales-manager the other day. "He is the fellow who comes in to sell you his line in preference to the one you are now handling and who assumes that you do not know what it is all about. "Why," he says, "I saw hundreds of homes here today where you should sell my stuff—and you just order a carload and I'll show you how." If he could show me how and then produce his order book he would be more likely to get an order. But even at that I do not like to think I have been in this business all these years and do not know a thing about it yet, when my sales records show that I have kept up with the procession, and, in some instances, have gotten ahead of it."

A WORD OF WARNING

You remember when you were knocking doors you worked for high-pressure, hard-boiled, fast-living, imaginative spell-binding, temperamental, slow-and-easy, domineering-driving and the "human" types of sales managers. You know full well which type secured your full support and you know full well the type that muffed the ball, and who after a short time "folded his tent and wandered away." And now, "Don't undo others as you have been undone by them."

DRYERS

Jim Trainer is everlastingly at it, and if there are not more gas dryers sold in 1928 than ever before we miss our guess. When you read this don't you wonder why you have not sold more dryers? We are strong for the home laundry—it's a great place to start to build up sales per meter.



Physicians claim more colds are contracted by sudden changes of temperature than by any other cause. And colds are the contributing factor to pneumonia and other respiratory ills.

When a housewife goes from a steam-filled room to the cold outdoors, with a heavy basket of wet clothes, she is invariably in a hurry. She dislikes the task of pinning flapping garments on sagging lines -- and in her haste to get through, often forgets to put on a wrap. Consequently colds, pneumonia -- and even death may be the result.

Here is a picture you can paint for your dryer prospect -- and make it strong without exaggeration. Perhaps you know of a specific case where "Hanging up the clothes" has resulted in pneumonia, influenza -- or where the housewife has fallen on a wet or slippery walk.

Emphasize the point that with a Lamcock Dryer all these hazards are eliminated. It dries the clothes spotlessly clean right in the laundry room. It enables the housewife to wash on the same day each week, dry her clothes and iron them, all in one day. It minimizes work, worry and tiresome waiting.

Talk up Thermostatic Heat Control -- stainless drying rods -- ease of operation ARMCO construction. And don't forget that if a Lamcock Dryer prevents one serious illness in a lifetime it has paid for itself many times over.

January 14, 1928.

Jim Trainer.

KEEP POSTED

Get into the habit of giving your industry a half hour each evening, of reading the association's publications, the trade papers of the industry and those others devoted to some specific subject in which you are interested. "Reading maketh a full man"—sure! But it is not all bunk, and again, what

is bunk to you may be bacon to the other bird. Even if you do not agree with what you read, the reading has been helpful if it causes you to think.

THINKING

"Thinking," said the oldtimer, hitching at his galluses, "plays thunder when it's not done along the right line."

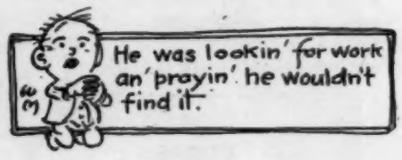
"Meaning which?" inquired the former efficiency expert.

"Why," continued the oldtimer with rising heat, "I mean just what I said. Consider these birds who claim to want to sell appliances. They admit they are wizards, and yet will turn up their noses at less than fifty-four bucks a week to start.

"Work—that's what these fellows need! And if they have in their make-up all they claim it won't take 'em long to get that fifty-four per—and then some.

A Disease

"That's what I mean, crooked thinking! It's a disease. And if these boys have not worked since the start of Christmas shopping, due to a cut in the force, and since then, because they could not get the fifty-four per, they are thinking backwards, and I reckon a lot of 'em are walking close to their uppers.



"There's too much of that one-way kind of thinking being done. Why, it seems as though some of these fellows are getting to believe that there is such a thing as subsidized salesmanship. That's the attitude they assume when

they come down here and ask for work. Evidently their thinking apparatus has gotten all ballyhoo during the days of balloon selling, and they've failed to get rid of enough gas to come down."

"But," persisted the former efficiency expert, "you lose sight of the fact that these men are all high-pressure salesmen, and"——

"Whoa!" wheezed the oldtime, scoring another bullseye in the cuspidor. "I am fully aware that these birds claim they want to work; yet they set their own price, and that's where I'd venture the opinion that they are doing crooked thinking.

Another Angle

"Now let's look at the matter from another angle. The ad that Jones has been running reads something like this: 'Wanted: $100 a week men who do not care what their prospective mother-in-law thinks of them. To such men we offer, on a strictly commission basis, an opportunity to draw down real money each pay day. The work is strictly legitimate. Twin City Appliance Company.'

"That ad goes right to the mat. It offers an opportunity to earn; it calls for high-class men to represent a well and favorably known outfit. Do you suppose these fellows thought for an instant that the Twin City folks were founding a has-been's home or that they had an appliance or line of appliances that would sell on sight? Further, do you fancy that all they wanted was a bunch of kindly disposed individuals to divide the profits with? Not by a jugful! They read that ad and came down here all primed to puff us up with personal stories, with the hope of securing special dispensation and a soft berth on the basis of past performance."

"Well, you can't hate them for that," interrupted the F. E. E. "I don't. I am like the mental gymnast that used to come down to the King Company when I was there. I can recall he used to ramble something like this: 'Now, boys, you can go up the ladder of life just as far as you think you can if you work fast and furious and focus your mind on a fixed point, but no further. You can sell potato-buggers in exact ratio to the amount of pep you charge yourself with. In other words, you will be successful in so far as you think success.' Those fellows who have been answering Jones' ad have doubtless come to this conclusion."

Fancy Salesmanship

"Just a moment," condescended the oldtimer. "I can't seem to grasp this line of reasoning. Of course, I don't know much about psychol—or whatever-thesamhill you call it—salesmanship you speak of, but I do believe that if some of these boys who have answered Jones' ad would forget all this stuff, sometimes labeled as pep, ginger or inspirational talks, and think only of the ad and its promises and then go out and hustle, some of them would be producing before the week was ended.

"You know your talk has caused me to think well of what a young fellow wrote me a while back. He said, 'I sure put it over here last month, and they are still buying. I pulled lots of doorbells, believe me! I hustled, as I wanted to show some of the dead ones what could be done if they would open up and let go.'

Why He Put It Over

"There is the dope in a nutshell. 'I hustled—opened up and let go—pulled lots of doorbells.' And as a consequence he sold merchandise and 'they are still buying.' Incidentally this young man is working on a commission basis. About two months ago he wrote me, saying: 'Well, here I am, in ———, a town of about 15,000, half plain and half colored, working on a commission. You know, a fellow with a wife and a gang like mine has to work.' You see why he put it over, don't you," chuckled the oldtimer.

"But," broke in the F. E. E.

"Hold your hosses," growled the oldtimer. "You have the answer; it's work. And work's reward is a bloated pay envelope. Many a man has gone to work, taking the first job open and putting into it enough initiative and work to make it a paying position. It can be done.

"Yes, siree," concluded the oldtimer as he waved his stenographer out of the office and studied the racing form, "plain work without frills is what counts."

TO ALL SALESMEN

"No sensible working bee will listen to a bed-bug on the subject of business."—Hubbard.

Everything is all set for our Spring Range Sale. We think we have a pretty nice "'set-up," a good line of merchandise, a reasonable payment plan and a "bang-up" time to sell ranges.

We are telling our story through newspaper advertising to practically every home manager on our distribution lines.

We have worked hard to do these things—we want next month to show up good; we want you boys to be able to make a substantial cash payment on that new buggy and in so doing prime yourselves for a bigger and better year this year.

Notwithstanding what any one may say, this is the retail salesman's harvest time.

Don't let any one, whose chief pastime consists in polishing the "bosom" of his trousers and passing out pessimistic predictions, make you believe that the idea of new home appliances at house cleaning time is passe.

There never has, in the history of the world, been a time when women and hard-headed business men gave more thought to their personal comforts than they do today. This means that gas appliance salesmen have never had the sales opportunities they have today. You boys know that.

Now with that knowledge, and our appliances you have a wonderful opportunity to cash in and be assured of the reward that comes to every consistent plugger. Run down your live prospects—call on old ones and create new ones—"'don't listen to the bed-bug on the subject of business." You can't afford to.

Then again, remember this, everyone is in a buying mood at this season. Don't let them stall you about no money—man alive, our plan of a small payment down and the balance little by little with the service account permits everyone to add comfort to his home and never miss the cost.

Preach the gospel of better foods—home cooked, more pleasure, less pot watching and indigestion—and above all, expose yourself to more sales every day. Let's all go now and put this sale over.

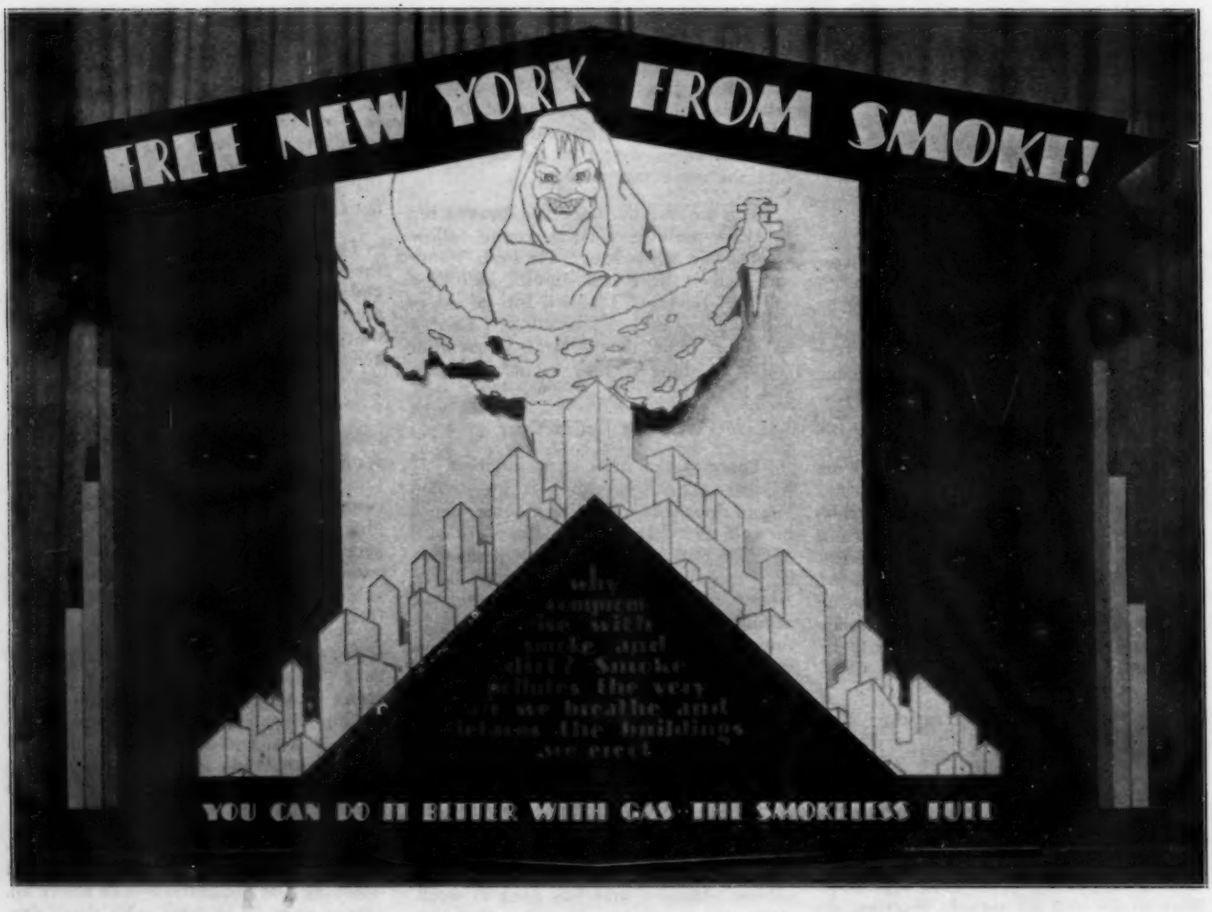
Yours forasockful,
Sales Manager.

P. S.—Anything we can do to help you? "Holler" if you have a prospect comin' in; give us a slip with his name and when to expect him and, believe us, we will lay for him.

TRAVELING KITCHEN

Women Democrats of the Sixth Assembly District saw a travelling kitchen in operation on February 9, during a demonstration given at the club house, 116 Tompkins Avenue, by Miss Ruth Soule of the Brooklyn Union Gas Company. Using one of the new regulated ovens, Miss Soule produced a savory meal consisting of veal loaf, franconian potatoes, stuffed onions, carrot salad and, by request of her audience, a lemon meringue pie. In a brief talk she made suggestions for budgeting food and obtaining the greatest value from fuel. Each woman present received a sample of the meal.

Mrs. Rae Rudick, co-leader of the district, presided.



Educational Window Display Advertising

By Ray Martin

Chairman Window and Store Display Committee, American Gas Association

DO YOU think that this window display advertisement would be of more value to your company than a simple or elaborate grouping of gas appliances? Do you think that the immediate sale of one hundred or one thousand toasters or waffle irons is worth devoting window space to them—in preference to a display possessing the potential possibilities of the one pictured?

To be sure, small appliances are not to be disregarded. They represent a a highly desirable gas load. But consider, please, the gas sales incidental to freeing "your city" from smoke. You will note we do not include a single gas appliance in such an educational window display. The inclusion of one or more would tend to confuse the observer. The job of freeing New York or any other city from the annoyance of smoke must be accomplished by the use of not only a gas furnace, etc., but in addition, a number of industrial and hotel and restaurant appliances. Consequently, we eliminate all from a display dealing with this subject. Then, too, when we present an educational window display it is in better taste if we avoid the commercial aspects of showing actual gas appliances.

After viewing this window display no one could leave with the impression that our intentions were solely altruistic, but at least we avoid stressing the commercial benefits we would derive.

The use of an allegorical figure to assist in expressing the "Smoke Monster" thought strengthens this display. It is forceful and sufficiently exaggerated to make an impression on the observer's mind.

Another point in favor of the educational window display is that every passerby is a prospect for "Free New York From Smoke," whereas only a comparative few of those who see a display of appliances are prospects for one of the articles shown.

If you are interested in building the gas load of the future, educational window display advertising should be given real consideration.

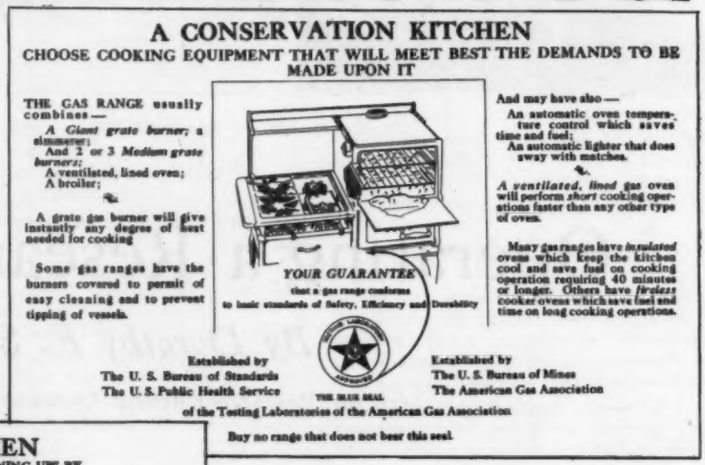
A CONSERVATION KITCHEN
INSURE UNIFORM COOKING RESULTS AND RELEASE FROM CONSTANT KITCHEN DUTY BY PERMITTING THE STOVE TO DO THE COOKING UNMOLESTED
One dish or a whole dinner may be BAKED or BRAISED UNATTENDED in
An
AUTOMATICALLY REGULATED GAS OVEN
The temperature wheel is set for degree of heat necessary to cook foods in desired time. Complete and varied dinners may cook at low temperature for 3 to 6 hours unattended or at a higher temperature for shorter periods.
Or
A FIRELESS COOKER GAS OVEN
The gas is turned on full for specified time after which it is turned off and food cooked on retained heat.

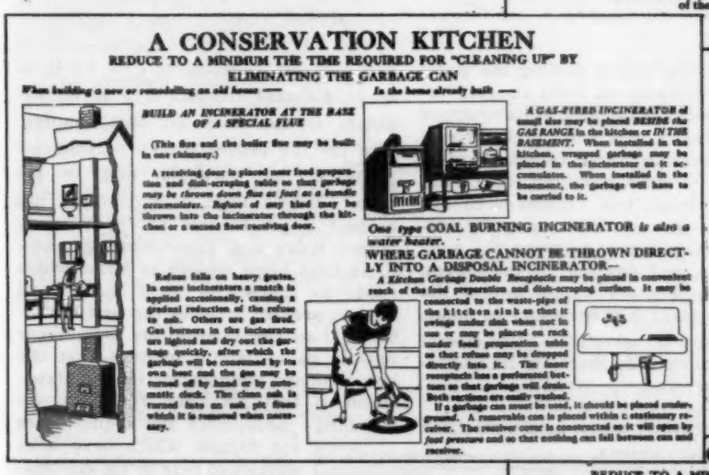
WOMAN'S CLUBS FEDERATION BOOSTS GAS

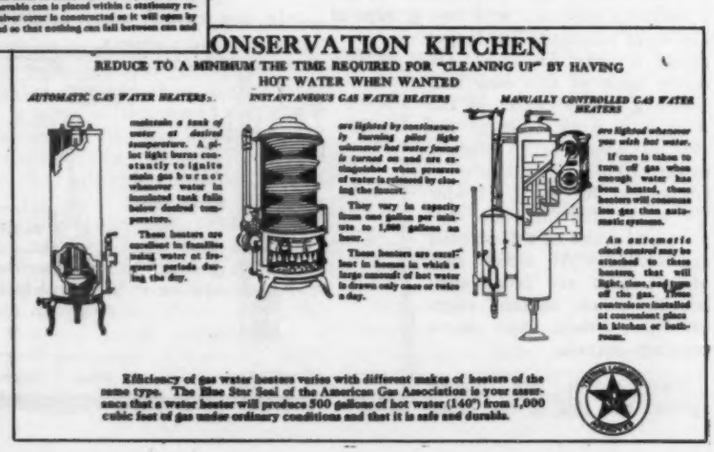
Primers prepared as a result of its Modern Home Campaign are being issued in large numbers by the General Federation of Woman's Clubs for distribution throughout the country. City gas, one of the most potent influences in modernizing the home, is given appropriate attention by numerous well illustrated pages. Material shown on this page gives part of the splendidly illustrated text which relates to "A Conservation Kitchen."

The gas men of the United States have found in the Federation a staunch ally in the development of gas for its proper part in solving the household problems on a basis of maximum comfort, efficiency and safety.

These primers should be of great value in furthering the domestic use of gas.


A CONSERVATION KITCHEN
CHOOSE COOKING EQUIPMENT THAT WILL MEET BEST THE DEMANDS TO BE MADE UPON IT
THE GAS RANGE usually combines —
A Giant grate burner; a simmerer;
And 2 or 3 Medium grate burners;
A ventilated, lined oven;
A broiler;
A grate gas burner will give instantly any degree of heat needed for cooking
Some gas ranges have the burners covered to permit of easy cleaning and to prevent tipping of vessels.
YOUR GUARANTEE
that a gas range conforms to basic standards of Safety, Efficiency and Durability
And may have also —
An automatic oven temperature control which saves time and fuel;
An automatic lighter that does away with matches.
A ventilated, lined gas oven will perform short cooking operations faster than any other type of oven.
Many gas ranges have insulated ovens which keep the kitchen cool and save fuel on cooking operation requiring 40 minutes or longer. Others have fireless cooker ovens which save fuel and time on long cooking operations.
Established by
The U. S. Bureau of Standards
The U. S. Public Health Service
THE BLUE SEAL
Established by
The U. S. Bureau of Mines
The American Gas Association
of the Testing Laboratories of the American Gas Association
Buy no range that does not bear this seal.


A CONSERVATION KITCHEN
REDUCE TO A MINIMUM THE TIME REQUIRED FOR "CLEANING UP" BY ELIMINATING THE GARBAGE CAN
When building a new or remodelling an old house —
BUILD AN INCINERATOR AT THE BASE OF A SPECIAL FLUE
(This flue and the boiler flue may be built in one chimney.)
A receiving door is placed near food preparation and dish-scraping table so that garbage may be thrown down flue as fast as a bundle accumulates. Refuse of any kind may be thrown into the incinerator through the kitchen or a second floor receiving door.
Refuse falls on heavy gates. In some incinerators a match is applied occasionally, causing a gradual reduction of the refuse to ash. Others are gas fired. Gas burners in the incinerator are lighted and dry out the garbage quickly, after which the garbage will be consumed by its own heat and the gas may be turned off by hand or by automatic clock. The clean ash is turned into an ash pit from which it is removed when necessary.
In the home already built —
A GAS-FIRED INCINERATOR of small size may be placed BEHIND the GAS RANGE in the kitchen or IN THE BASEMENT. When installed in the kitchen, wrapped garbage may be placed in the incinerator as it accumulates. When installed in the basement, the garbage will have to be carried to it.
One type COAL BURNING INCINERATOR is also a water heater.
WHERE GARBAGE CANNOT BE THROWN DIRECTLY INTO A DISPOSAL INCINERATOR—
A Kitchen Garbage Double Receptacle may be placed in convenient reach of the food preparation and dish-scraping surface. It may be connected to the waste-pipe of the kitchen sink so that it swings under sink when not in use or may be placed on rack under food preparation table so that refuse may be dropped directly into it. The inner receptacle has a perforated bottom so that garbage will drain. Both sections are easily washed.
If a garbage can must be used, it should be placed underground. A removable can is placed within a stationary receiver. The receiver cover is constructed so it will open by foot pressure and so that nothing can fall between can and receiver.


ONSERVATION KITCHEN
REDUCE TO A MINIMUM THE TIME REQUIRED FOR "CLEANING UP" BY HAVING HOT WATER WHEN WANTED
AUTOMATIC GAS WATER HEATERS
contain a tank of water at desired temperature. A pilot light burns constantly to ignite main gas burner whenever water in insulated tank falls below desired temperature.
These heaters are excellent to furnish using water at frequent periods during the day.
INSTANTANEOUS GAS WATER HEATERS
are lighted by continuously burning pilot light whenever hot water faucet is turned on and are extinguished when pressure of water is released by closing the faucet.
They vary in capacity from one gallon per minute to 1,000 gallons an hour.
These heaters are used best in houses in which a large amount of hot water is drawn only once or twice a day.
MANUALLY CONTROLLED GAS WATER HEATERS
are lighted whenever you wish hot water.
If care is taken to turn off gas when enough water has been heated, these heaters will consume less gas than automatic systems.
An automatic clock control may be attached to these heaters, that will light, time, and turn off the gas. These controls are installed at convenient place in kitchen or bathroom.
Efficiency of gas water heaters varies with different makes of heaters of the same type. The Blue Star Seal of the American Gas Association is your assurance that a water heater will produce 500 gallons of hot water (140°) from 1,000 cubic feet of gas under ordinary conditions and that it is safe and durable.

An arrangement of equipment that is conducive to accurate research.

Operating a Research Kitchen

By Dorothy E. Shank

Director, Research Kitchen, American Stove Company

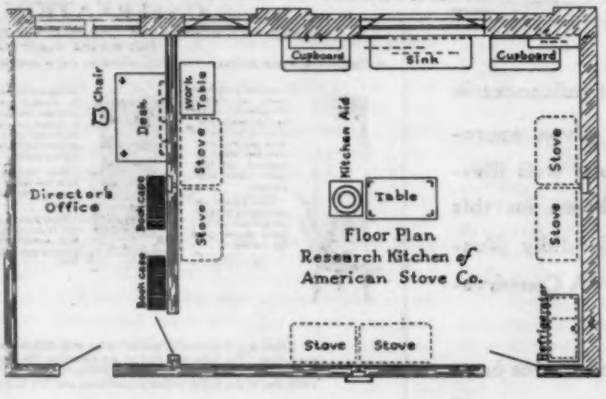
THE American Stove Company, made up of the following six divisions, Geo. M. Clark, Dangler, Direct Action, New Process, Quick Meal and Reliable, completed a new Research Kitchen late last May. Ever since then it has been a busy place.

The accompanying diagram and photograph of the kitchen help to show the layout and to illustrate its efficiency and attractiveness.

The kitchen, measuring approximately 18 by 23 feet, has sanitary walls of vitrolite. The ceiling is ivory and the side walls are a soft grey green. It has a northern exposure with two groups of casement windows. The larger group is over the sink. Directly back of this sink and standing in the center of the floor is a work table at the side of which is an electric mixer. This arrangement is convenient for work. Under the work table the main supplies and some of the utensils are stored. At either side of the sink are large cupboards which contain extra supplies, dishes, and more cooking utensils.

Two stoves are placed against the side of the other three walls for use in making the many tests and carrying on oven cookery research. Because the kitchen is equipped with six stoves, one from each division of the American Stove Company, it is necessary to have a larger room than for the average test kitchen with but one or two stoves. This naturally emphasizes the distance between the sink, work table, and any one of the stoves, so the use of a tea wagon lessens the number of steps it is necessary to make. This table on wheels is attractively colored, which adds charm to its usefulness.

In this kitchen many meals are tried with various combinations of foods at many different temperatures in an endeavor to determine the best temperature for the proper length of time for preparing that particular meal in the oven. Whole meal oven cookery has become a great time saver in many homes today and experimenting along these lines helps women to know which foods to choose for their meals and how to prepare them to the best advantage. Favorite recipes are sometimes sent in to us with a request that the best time and temperature for the preparation of that particular recipe be determined. Sometimes the requests are for recipes which have been developed here or for information which can be used for demonstration purposes.



Floor Plan Research Kitchen of American Stove Co.

Several pieces of work along the line of food research have been undertaken and the material which has been gotten out as a result of these investigations has been incorporated in reports which are then issued and sent to those interested in Home Economics work. The baking of some batters was the first problem to be investigated. A study was made

of Popovers. This is the very thinnest of all the batters made and probably has the fewest ingredients involved and yet a study of the recipes found in many cook books showed such a wide variation in the proportion of ingredients used and a great difference in the temperature at which they were to be baked that we became interested in determining the recipe which we should consider would give the best general results; in determining the proper time and temperature for baking them, and the result of different methods of mixing. As a result of this investigation we found that the most desirable recipe for Popovers is:

1 cup flour,
1 cup milk,
2 eggs,
1 tablespoon melted butter,
¼ teaspoon salt.

Best Baking Temperature

It was also found that the best temperature for baking popovers is 450 degrees Fahrenheit for 30 minutes, and then 350 degrees for 15 minutes; that it is possible to make popovers at 425 degrees for 45 minutes, which is a little easier than trying to remember to reduce the temperature at the end of the first 30 minutes. The popovers were not quite as good when baked at the one temperature as at the two, but when ease of work is considered it is possible that a very slightly less satisfactory product may be justified.

The simplest method of mixing the popovers was found to be the most satisfactory, that is, to add the beaten egg to the milk and combine this slowly to the sifted flour and salt, beating just enough to mix thoroughly. Beating the whites and yolks of eggs separately not only does not improve the product but causes the texture to become somewhat similar to that of muffins.

Muffin Study

Muffins were the next division of Batters and Doughs to be studied. Here again the variation in the proportion of ingredients used in the recipes was very wide and once more we were interested in studying this phase of the problem, applying it to muffins. The proper temperature for the best length of time and the method of mixing were also studied. Muffins require more ingredients than popovers. The batter is thicker and all of the ingredients used in popovers are used in muffins, but in different proportions, and in addition baking powder and sugar are added. The amount of flour to the amount of milk is increased, the amount of fat is increased, and the number of eggs in proportion to the amount of flour are decreased. We used different amounts of baking powder in order to determine the best amount for the best proportion of other materials.

Varying Ingredients

The amount of sugar and fat were also varied to determine the best proportion of these. Honey was substituted for sugar to see whether this would make a satisfactory muffin, as there is a great deal of honey being produced and sold today. Many people like the flavor of it and some people are making an attempt to decrease the amount of sugar which is used in the diet. As a result of these studies the following conclusions were reached:

The best recipe for muffins from the standpoint of appearance, color of crust, texture and flavor is:

2 cups flour,
¼ cup sugar,
¼ cup fat,
1 egg,
1 cup milk,
4 teaspoons baking powder,
½ teaspoon salt.

The best temperature for baking these muffins is 400 degrees F. The best length of time for baking is 25 minutes, if pans of average size and light color are used.

Muffins mixed by the "cake method" are more attractive in appearance than when mixed by the "muffin method." There is no difference in texture between the two methods.

Unwise to Beat Batter

It is unwise to beat the muffin batter longer than to mix it well, as overbeating has a tendency to develop tunnels and produces coarse, heavy, and tough muffins.

As the amount of sugar is increased from 2 tablespoons to ½ cup the texture becomes finer, more even, and tender, and there are fewer tunnels.

Muffins baked in pans of heavy materials may need to bake one or two minutes longer than when the ordinary weight material is used, if the same color is desired for the crust. If the color of the pans is dark, the muffins may have to be removed from the oven one or two minutes sooner for the same color of crust, than if they were baked in pans of the same weight but of light color. Muffins baked in very small pans will be baked in less time, possibly five minutes, depending on the size of the pans, than when baked in pans of the regular size. Those baked in pans of very large size may have to bake two minutes longer. As a rule, the muffin pans of large size are wider and not deeper than those of regular size. For this reason muffins baked in them will not need to bake as much longer as though the pans were wider and deeper, in which case the heat penetration would likely be longer. There seems to be no "standard" size for muffin pans.

Honey is a natural sugar and therefore a healthful one. It can be used in place of sugar in making muffins with great success. It can be substituted for sugar in the same amount as though sugar had been used. When using honey decrease the amount of liquid used in the recipe from one cup to three-quarters of a cup.

Gingerbread was chosen for the next study which was made. This batter differs from that of the muffins in that molasses, baking soda, and spices are added to the rest of the ingredients which would be used for muffins and water is substituted for milk. Molasses is an ingredient which is very sensitive to heat and so would probably show the effect of different temperatures on the batter quicker than some others which might be tried so that a rather complete study was made of baking gingerbread after a standard recipe had been determined. The temperatures were varied from a very low heat to a hot oven.

A Perplexing Problem

Another problem which has been very perplexing to people for some time is that of differences between the brands and grades of flour found commonly on the markets and to note the effect these different types of flours would have on the texture of any given product. We were again interested in whether honey could be substituted for sugar here as in the case of muffins. This investigation led us to the following conclusion, that

½ cup fat,
½ cup sugar,
2 eggs,
2½ cups flour,
1½ teaspoons baking powder,
½ teaspoon soda,
½ teaspoon salt,
1 teaspoon ginger,
1 teaspoon cinnamon,
¼ teaspoon cloves,
1 cup molasses,
1 cup boiling water,

made the most satisfactory gingerbread; that it is possible to bake this gingerbread and have a result which is edible if it is baked at any one of the temperatures tried, 250 degrees for 1 hour and 50 minutes, 275 for 1 hour and 20 minutes, 300 for 1 hour, 325 for 55 minutes, 350 for 40 minutes, 375 for 35 minutes, 400 for 30 minutes, 425 for 25 minutes, and 450 for 20 minutes. The result is not equally satisfactory when any one of these temperatures was tried.

When baked at the low temperatures the gingerbread required a longer time to sufficiently bake. At these temperatures the product became more compact and did not raise as high as it

did at the higher temperatures. The crust is sticky and the flavor is strong. When baked at the higher temperatures than that given as the most desirable the length of time must be shortened. As the temperatures are increased the gingerbread apparently browns before it bakes sufficiently. The top becomes too brown, in some cases burning slightly. In some corners it cracks, the cracks often extending down to the bottom of the gingerbread. It raises higher, but is drier and has a somewhat coarser texture and a harder thicker crust.

Experiments were made on the following grades of flour: specially prepared cake flour, pastry flour, all-purpose flour, bread flour, bread flour and cornstarch, self rising flour. It was found that an ordinary pastry flour or an all purpose flour seems to make the most satisfactory gingerbread.

Specially prepared cake flours make gingerbread compact and inclined to be soggy. They do not raise well.

Gingerbread made of bread flours becomes light and porous in texture, but it is very dry and does not keep well.

Cornstarch substituted for two tablespoons of bread flour to each cup of flour is an improvement over using bread flour alone.

When self rising flours are used the texture is light and porous and it is also coarse and loose. The gingerbread falls apart easily. It becomes very dry after 24 hours.

It was found in the case of gingerbread that honey could be substituted for one-half cup sugar in the original recipe as the amount of water is decreased.

The Salesroom Beautiful

(By Special Correspondent)

THE Portland Gas & Coke Company's magnificent new salesroom, occupying nearly 100 by 100 feet and a height of 25 feet, including the mezzanine floor of about 25 by 200 feet, is one of the finest in America, as far as I have had the privilege of visiting the gas stores in the various large cities of this country.

The store has on two sides very large windows, in fact, the entire front of the two street sides is almost all glass, and on account of the floor being considerably below the street level, there are no individual show windows provided, so that in passing by I beheld the entire display at a glance, and the first impression I received was that the gas business must be an important one in the life of this Pacific Coast city, and secondly, that the gas company officials evidently believed in their product and its value and future.

The rear of the salesroom was a bare wall, a place which is always hard to utilize or dress up, and as the commercial manager desired to have his various appliances hooked up and operating, the question was how to vent such appliances without ugly chimneys or vent pipes.

From this necessity developed the thought to build a hood along that bare wall to carry out the products of combustion, and as the picture shows, this hood was designed in the way of an arcade by putting in four pillars and six arches; the front of the so-called hood being beautiful shirred velvet drapes of a burnt-orange shade that harmonizes with the handsome enormous cashiers' counter, which is of yellow Spanish marble and with the floor which is of tile, shading from yellowish pink to dark red.

No lights are allowed in the Arcades excepting two spotlights in each, and each alcove is dressed up with what the commercial manager termed "scenery," attractive things that appeal to the women, who, after all, are the power behind the throne when it comes to buying appliances.

In this way, while the lamps may have soft lights in them to beautify the alcoves, there is a general impression of subdued lighting excepting the one article the company wishes to emphasize, and on this particular article two strong spotlights are directed with colored

40 TIMES MORE THAN IN 1922

Since 1922, the annual production of Water Gas from Boone-Chilton Coals has increased forty fold.

This notable increase in BOONE-CHILTON operation is significant —It can be attributed to but one cause—

GREATER OPERATING ECONOMIES

Economies determined after years of satisfactory operation — not from a few weeks performance.

Insure lowest manufacturing costs and avoid operating difficulties by specifying BOONE-CHILTON.

BOONE-CHILTON

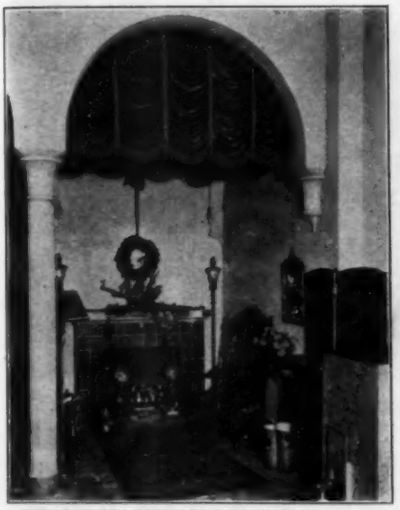
WATER GAS COAL

Produced and sold exclusively by
BOONE COUNTY COAL CORPORATION

General Sales Offices
450 BULLITT BLDG.
Philadelphia

Mines & Operating Offices
Sharples, W. Va.

Western Offices
630 McCORMICK BLDG.
Chicago



Living Room Alcove

light to suit the nature of the appliance.

One room is very beautifully furnished to show house heating and the Gas Heatrola is in the spotlight, which is red. The comfortable chair, smoking set, the books on the little table, the Turkish rug and Chinese tapestry, with the charming reading lamp, are what I have already referred to as the "scenery," but one cannot stand in front of this little booth, attracted by its homey beauty, without immediately having the eye attracted to the Heatrola in its brilliant red spotlight any more than he could sit facing a stage and not see the actor or actress on whom the spotlight is thrown.

In the general picture this particular Heatrola space, the fifth one from the left, can hardly be distinguished in detail on account of it being so far in the distance.

In the general view the first Arcade from the left shows the beautiful setting of the new combination Radiantfire and mantel, while the third one only shows the bath tub, towels, wash-stand and mirror, but to the left is the thing which is really brought out in yellow spotlight, the Ruud Autohot Automatic Storage Waterheater.

The second booth has a white spotlight on a beautiful gray and white enameled Smoothtop ornamented with a couple of bright red vessels and a percolator. The "scenery" consists of a kitchen cabinet with some kitchen chairs and the Delft kitchen clock.

The fourth booth is given over to gas refrigeration, having a refrigerator and Ice-O-Lator installed, while on the little enamel top table stands an ice-tea set. One of the most attractive booths is the last one, which, like the first one, contains a fireplace, but this time is devoted to Gasco briquets—the kind that give no ashes. Not only are the two red spotlights thrown on the briquets,

Gas Refrigeration Display

but there is a red electric light behind it, making them look as if they were burning, while in the booth just described where the refrigerator stands the spotlights are blue.

As the Sunday Oregonian stated in describing this new way of using a blank wall: "To have attractive displays and show windows is nothing new, but to create show windows by building an Arcade in front of a blank wall very likely is entirely original."

The above window display, featured by **Public Service** *Electric and Gas Company, Newark, N. J., created a great deal of favorable comment. The appliances and accessories displayed included a Kelvinator Refrigerator, Roper Gas Range, Breakfast Set, Kitchen Cabinet, Cooking Utensils, etc., all in a shade of green which blended in with the other furnishings and decorations in the windows*

Fundamental Studies of Industrial Gas Utilization

By Alfred H. White

Professor of Chemical Engineering,
University of Michigan

East Engineering Building, University of Michigan

THE Michigan Gas Association has supported gas engineering research work at the University of Michigan since 1900, and the very first work that was undertaken was on the utilization of gas. Progress has been so rapid that it is difficult to realize that twenty-five years ago the main use of gas was as an illuminant, that flat flame burners were still in use, and that gas was sold on a candle power specification. The Welsbach mantle had only recently been introduced, and the reason for its high efficiency was in dispute. The first three holders of the fellowship, Herman Russell, A. F. Traver and Max Mueller, studied this problem of the Welsbach mantle and showed quite clearly that the high illuminating efficiency of the mantle was due to its high temperature, and that this in turn was more a function of the heating value of the gas than it was of any other easily determined factor. This work had a real importance in speeding the change from illuminating value to heating value as the standard for gas.

Excellent Carburizing Agent

After some years spent in studying manufacturing problems, the research work came back to the utilization of gas as a heating agent in metallurgical furnaces. It was shown in 1915, through the work of Homer T. Hood, that city gas made an excellent carburizing agent for steel. This was not entirely unknown before, but it had been claimed that illuminating gas gave too hard and sharply marked a "case" if any attempt was made to carburize rapidly at high temperatures. The work at the University of Michigan showed that by case hardening at a high temperature for a relatively short time and then turning off the carburizing gas and allowing the hot metal to soak in the furnace there was diffusion of the carbon toward the interior of the piece and any desired type of case could be obtained.

Advantage of Neutral Atmosphere

It was further demonstrated by this work that by using a neutral atmosphere iron and steel could be heated to a forging temperature without any oxidation or formation of scale on the surface of the metal. A neutral atmosphere of this type was produced when approximately one volume of illuminating gas was made to combine with two volumes of air. This mixture is so rich that it will not burn unless preheated, but this atmosphere, although neutral to iron, decarburizes steel slowly at forging temperatures. It acts as a much less active decarburizing agent at this temperature than the ordinary furnace atmosphere and may be rendered still less active by using a mixture still richer in gas. At the lower temperatures used in heat treatment, gas of this composition would cease to exert a decarburizing action.

Commercial Application Feasible

It was pointed out in 1915 that it would be entirely feasible to make a commercial application of this process. The following extract shows the plan recommended:

"The heat evolved by the primary combustion within the muffle is about 27 per cent of the possible total heat and is sufficient to give a theoretical combustion temperature of 2,300 degrees F. when starting with cold gas and cold air. A secondary combustion around the muffle aids in keeping up the temperature so that there is no trouble in actually realizing the temperature of 2,200 degrees in a muffle. This secondary combustion liberates all the heat units in the gas and so raises the thermal efficiency. If the sensible heat of the waste gases should be used to preheat the entering air, a high efficiency could be obtained. When starting with a cold furnace, the full amount of air for complete combustion could be introduced into the gas burning within the empty muffle, which could thus be quickly and efficiently brought to a working temperature. The primary air supply could then be reduced to the desired amount and the metal introduced into the muffle, where, being directly exposed to the neutral gases, it would be more rapidly heated than in an externally heated muffle and would still be protected from oxidation. The saving in metal should be considerable

Past Researches Stimulate A. G. A. Appropriations

Recognizing the great value of the industrial gas research which has been done at the University of Michigan during past years, the A. G. A. has allotted funds to that institution for investigation of gas-fired forging furnaces. This research will be under the direction of Professor Alfred H. White, the author of the accompanying article, which gives the readers of the Journal an exclusive review of the earlier studies.

The University of Michigan has splendid facilities for this work in the new engineering building recently completed, where a large area is devoted to fuels and metallurgy. The projected studies are typical of the cooperative investigations arranged under the Department of Engineering Research which has been organized by the University to care for such industrial research supported by associations, corporations, and other outside agencies.

and would probably compensate for any increase in the cost of fuel. The process presents attractive possibilities in its application to the automobile industry and other industries where quality is paramount."

Studies in Brass Heat Treating

The heat treatment of brass in neutral and reducing atmospheres was studied at the University of Michigan in 1916 by Mr. Bert A. Standerline, who held the Michigan Gas Association fellowship for that year. The method used for heating iron and steel in a neutral atmosphere proved itself advantageous also for brass and copper, as is shown by the following extract from the paper published in that year:

"Copper is not oxidized when exposed directly to the products obtained from burning coal gas with an insufficient amount of air, the proportions of gas and air varying with the temperature to be reached. Up to 1,200 degrees F. three volumes of air to one of gas may be used, and still smaller proportions of air must be used for higher temperatures. The volatilization of the zinc from brass is primarily a function of the temperature but can be reduced to a minimum by rapid heating and a neutral atmosphere which limits the loss to that due to temperature and largely eliminates that due to oxidation. This rapid heating in a neutral atmosphere can be readily obtained in a muffle within which coal gas is burned with an insufficient supply of air and around which these products of combustion are burned with additional air. The pieces placed within the muffle are thus rapidly and evenly heated with a minimum loss of weight due to volatilization of the zinc. The loss of zinc, after brass with 70 copper and 30 zinc was heated to almost its melting point for an hour amounted to an elimination of zinc from a layer only 0.003 inches thick. With lower temperature even more favorable results were obtained. The actual commercial value of this process can only be determined after tests on a large scale. There is every reason to believe that with proper design of furnace it will be successful."

Japanning Investigation

A study of the influence of gases within the oven on baking japans was made in 1916 by John T. Naylon. He showed that the gaseous products of complete or incomplete combustion of gas from a city supply, such as carbon dioxide, water vapor, carbon monoxide, hydrogen and hydrocarbons, cannot exert any harmful action in the japanning oven so long as they remain in the gaseous or vapor form, and that it was immaterial from this standpoint whether japanned goods were exposed directly to the products of combustion or were heated in a gas fired muffle or in an electrically heated oven.

The condensation of liquid water within the muffle had to be avoided as liable to spot the goods. The gases arising from the combustion of coal gas with the theoretical amount of air are saturated for water vapor at about 150 degrees F., and if double the theoretical amount of air is used, they are saturated at about 125 degrees F. If the temperature at any point in the oven drops below this, there will be danger of spots. If the oven is warm when the goods are introduced, the danger from this source should be slight even in a direct fired gas oven and is, of course, entirely absent in a muffle or electrically heated oven. Dust or solid particles of any type are objectionable whether introduced with the air or formed within the oven. Soot may be formed through defective combustion of gas used as a heating agent, but with modern burners and proper draft there should not be trouble from this source.

Effect of Petroleum Thinner

This same investigation showed that the petroleum thinner of a japan oxidizes if air is present in the japanning oven and forms tarry or carbonaceous particles which deposit locally and cause defects on the finished goods. If no air is present the vapors of the thinner may be heated for three hours to 500 degrees F. without appearance of more than minute carbonaceous deposits, while with forty volumes of air to one of petroleum vapor an exposure of one minute to a lower temperature is sufficient to cause large and dense deposits. It is evident that since this formation of carbonaceous deposits is due to air within the oven, it may occur in the electrically heated or the muffle oven as well as that fired directly with gas. In fact, the direct gas fired oven should have an advantage since the inert carbon dioxide and water vapor will tend to sweep out the petroleum vapors without oxidation. It is believed that this phenomenon, previously overlooked, has been the cause of a material proportion of the defects in japanned goods.

All research work was suspended during the war period, and during the difficult years of post-war readjustment the gas companies were interested more in effecting economies in manufacture than in stimulating sales. The Michigan Gas Association has increased its support of research work on manufacturing problems, and an important study is being made of the efficiency of bituminous coals as raw materials for the manufacture of water gas.

The American Gas Association has recently allotted a portion of its research funds to the University of Michigan and the study of the behavior of steel in gaseous atmospheres, which was interrupted in 1916, is now being taken up again. The present study is centered upon the effect of neutral and oxidizing gases on steel which is being heated preparatory to forging. The opinion has been prevalent that the method of heating steel for forging had little to do with the quality after forging, since the drastic working during the forging process was believed to eliminate any coarse grain or other harmful effects which might have appeared in the piece as it came from the heating furnace. The demand for higher quality, which is insistent in the automobile world, has led to a critical study of this theory, and the work at the University of Michigan is directed toward finding out exactly how far damage may result to a finished forging through improper heating prior to forging. This investigation has not progressed far enough to warrant positive statements of results, but it seems fairly certain that lack of proper attention to temperature and chemical composition of the gases in a furnace may cause defects in forgings which are not apparent on the surface. These defects exist only beneath the skin of the forging and are evident only after the metal has been cut and the surface polished.

PLOTTING INDUSTRIAL MIGRATION

As a basis for determining the mobility of industry and the directions in which it moved in 1927, the Organization Service of the Chamber of Commerce of the United States has obtained reports from more than 300 cities and reports are still coming in.

When these reports have been compiled business will have at hand its first adequate chart of the currents of manufacturing movement—the extent to which it is changing its habitat, the extent of the disintegration of central plants by the establishment of branches at various strategic points, the movement from large cities to smaller cities and from smaller cities to larger, and the industrial expansion or contraction of certain scetions of the country as compared with other sections.

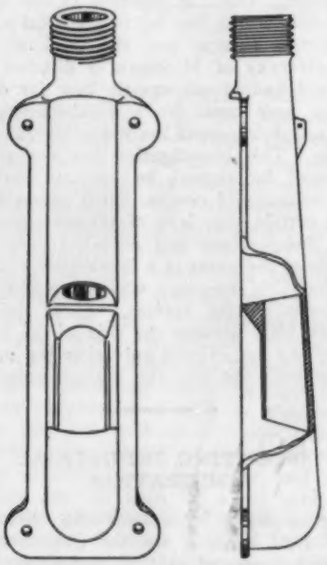
It has been recognized for some time that industry is displaying unusual restlessness and various conclusions have been drawn as to the significance of its movements, but up to the present time, the Organization Service explains, there has been no adequate basis for making deductions of this kind.

Reports from local chambers of commerce cooperating in the survey are now being compiled and efforts are being made to secure as complete a picture as possible of the changes occurring during the past year.

Equipment News

New Meter Pipe to Prevent Gas Theft

This baffle plate pipe claims to prevent the theft of gas by fraudulent persons by the use of a flexible wire, slightly bent, which is inserted into the outlet pipe of the gas meter and thence into the short channel, finally lifting the cover of valve, which allows the meter to pass gas without registering.



The baffle gas meter pipe is a standard meter pipe of brass, 7 inches long, and has four rivets similar in appearance to the one now in use and has a lug on the side for which a seal can be applied if so desired.

Full information will be furnished by communication with H. Klippel, 2240 Cornelia Street, Brooklyn, N. Y.

New Temperature and Relief Valve

The Time-O-Stat Corp., Milwaukee, Wis., have just issued a folder describing a new combination temperature and pressure relief valve, designed primarily for automatic storage heaters but adaptable to many other uses. It eliminates the possibility of the system filling with steam or building up excessive pressure.

The valve opens at 200 degrees F. and closes at 185 degrees F. and opens at 130 pounds pressure and closes at 115 pounds pressure. The valve contains only one valve seat. The pressure is exerted directly against the exposed portion of the valve seat. Excessive temperature causes the metal bellows to expand. The folder shows cross section cuts of the valve.

The folder will be sent on request.

Ironcase Meters for Industrial Service

The Metric Metal Works of the American Meter Company have just announced two new ironcase meters especially designed and manufactured for industrial service.

They are designated 250 B and 500 B because of greatly increased capacity and decrease in weight over the 100 B and 200 B ironcase meters which they replace in the regular line of Metric ironcase meters.

In the new 250 B meter a capacity of 5,000 cubic feet per hour is obtained on 2-inch differential and .6 gravity gas, while the 500 B gives 10,000 cubic feet capacity.

The manufacturer states that these new meters were made possible by a new improved valve mechanism designed three years ago. In addition, other features characterizing these meters are:

Timken bearings used in the crank step, crank stand and flag steps.

Alemite lubrication to all main bearings, applied from outside of case while meter is in operation.

Slide type valves and diaphragms of American tin meter type are used.

Below are given dimensional comparisons of old style 100 B and new style 250 B:

	Old Style 100 B	New Style 250 B	Old Style 200 B	New Style 500 B
Height	36⅛"	35"	41¼"	42"
Width	25"	24½"	29"	29¾"
Depth	26½"	25"	30½"	28¼"
Size connections	3" flg.	4" female	4" flg.	4" female
Capacity at .5" diff.	2,000 ft.	2,500 ft.	3,400 ft.	4,500 ft.
Capacity at 2" diff.	....	5,000 ft.	....	10,000 ft.
Weight	580 lb.	425 lb.	1,120 lb.	870 lb.
Working pressure	0-50 lb.	0-75 lb.	0-50 lb.	0-75 lb.

Steam Operated Controller

The C. J. Tagliabue Mfg. Co., Brooklyn, N. Y., recently issued Bulletin 950 describing the "Tag" Automatic Steam-Operated Controller, sectional view of which is shown in cut.

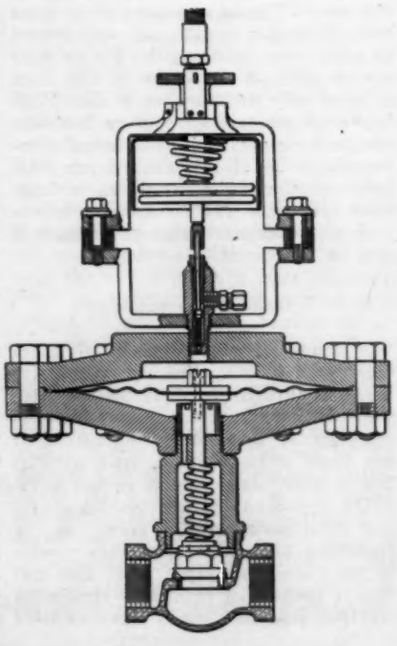
The controller is simply a device which utilizes a portion of the steam which heats an apparatus to obtain enough power to work the valve, the opening and closing of which governs the temperature of the apparatus where one best temperature must be maintained.

Power is obtained without waste from the pressure of the steam. Variations in this pressure do not affect the accuracy of control, for the reason that it is not the entire pressure, but a differential pressure above and below a diaphragm, which is thus utilized.

The steam is always permitted to enter the diaphragm chamber whether the steam valve is open or shut. If the steam above the diaphragm is allowed to escape then the pressure above the diaphragm will be less than below. This differential of pressure is sufficient to open wide the steam valve against the pressure of the main spring.

The thermostatic liquid in the sensitive bulb is partly vaporized and exerts a moderate pressure through the bellows on the pilot valve which is partly open. The rate of escape of steam from the upper portion of the diaphragm chamber is such that the differential, opposed by the main spring, maintains the steam valve at the correct opening.

A copy of bulletin will be mailed on request.



Each prospect has a dual nature ~ ~ *appeal to the right one!*

YOU can talk in terms of bungalow aprons or evening gowns. You can refer to morning chores or evening gaieties. You can set up a background of the kitchen or the ball room. For Hotzone hot water service is as important to home beauty treatments as it is to kitchen cleanliness.

Bear in mind that every manufacturer of facial soaps and shampoos—and every woman's favorite beauty specialist—advocates the use of warm water at unearthly hours as the first step to beauty.

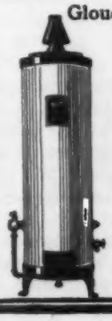
By the same token use the beauty appeal as the first and surest step to a Hotzone sale.

If you want to convince yourself just where the money is spent most freely, pause at the Housefurnishings Department and then at the cosmetic counter of your favorite store.

Welsbach has made the Hotzone more than a household necessity—it has made this wonder water heater a *beauty* necessity, also. Don't miss this point in your sales approach. Remember, the hand-mirror is mightier than the scrubbing-brush as a buying urge.

Welsbach has prepared a series of advertisements that commercial managers can use to back up their salesmen properly. Information and proofs will be sent on request.

WELSBACH COMPANY
Gloucester City, N. J. Offices in Principal Cities
Member of American Gas Association



Welsbach HOTZONE

SELF ACTION GAS WATER HEATER

Taken from Previous Issues of the American Gas Journal

TEN YEARS AGO

The Western United Gas & Electric Company has petitioned the public utilities commission for permission to divide Elgin, Ill., into ten districts, each with a different discount period, to lessen congestion in the office the eleventh of each month. The company asks that discounts be allowed for fifteen days following the reading of the last meter in each district.

The February output of the Boston Consolidated Gas Company was 557,556,000 cubic feet, or 8.1 per cent more than that for the corresponding month last year.

The Minneapolis (Minn.) Gas Light Company recently took out a permit for its new toluol plant at Bluff Street, between Cedar and 19th Avenues, South, to cost $15,500. It is to be completed May 1 and will be built by day labor.

The United Fuel Gas Company, owned jointly by the Columbia Gas & Electric Company and the Ohio Fuel Supply Company, has completed a new gas well in the Spencer district of West Virginia, which is good for about 22,000,000 cu. ft. of gas daily.

The Guild of Gas Managers held its annual dinner March 9 in Young's Hotel, Boston, Mass. Ex-Senator Robert Washburn of Worcester was the guest. The ceremonies began and ended with the singing of "The Star-Spangled Banner." Dana D. Barnum presided, and there were seventy-five present.

TWENTY YEARS AGO

Having decided to retire to private life, to more completely enjoy the fruits of his labor, Mr. W. W. Gibbs recently handed in his resignation as a member of the Board of Directors of the United Gas Improvement Company. The resignation was accepted and Mr. Rudulph Ellis, president of the Fidelity Trust Company, was elected to succeed him.

Messrs. Bartlett Hayward & Co. of Baltimore, Md., have been awarded the contract for the new purifying house to be erected in the Everett plant of the Boston Consolidated Company.

General Manager Henry B. Hoyt, of the Jacksonville (Fla.) Gas Company, reports good business since January 1st. He believes in the good value of demonstrations, for a demonstratress is on duty in the handsome offices on Forsythe Street, West, every afternoon between the hours of 2.30 and 5. Her model kitchen is verily the show place of the town, a part of which popularity is no doubt traceable to the fact that a dainty luncheon is served to each lady visitor while the demonstratress is demonstrating.

Messrs. James C. Noble, J. S. Laney and James S. Rodgers, representing the combination of Kansas City capitalists that are seeking the right to distribute natural gas in St. Louis, Mo., say that if their petition for a franchise is favorably acted upon they will have the distribution system completed within two years, and that the residents can safely count on a supply equal to 300 million cubic feet per day.

FORTY YEARS AGO

The Bridgeton (N. J.) Company is making important changes in its main system. This place is one of the best (and most cheaply) gas lighted localities in the State.

The Maryland Meter & Mfg. Company have published and are circulating a very handsome pamphlet intended to call attention to the advantages in general of gas for cooking and the merit in particular of their "Success" gas ranges, heaters, and other domestic agents for keeping the cook in good temper, while at the same time the digestion of the upper circles of the household is aided. We understand that their genial, handsome and wide-awake western general manager, J. M. Murphy, "edited" the pamphlet, and, like everything else that he undertakes to do, the task was well performed.

The new blood in the management of the Tonawanda (N. Y.) Gas Light Company seems to be of a lively and sound sort, for a 33 1-3 per cent reduction in selling rates has just been made. Former rate, $2.25; new rate, $1.50. Cheap gas, that.

The Laclede Gas Light Company, St. Louis, Mo., has purchased a tract of land on Evans Avenue near Sarah Street, whereon it will at once commence the erection of a relief holder (660,000 cu. ft. capacity) for the West End division.

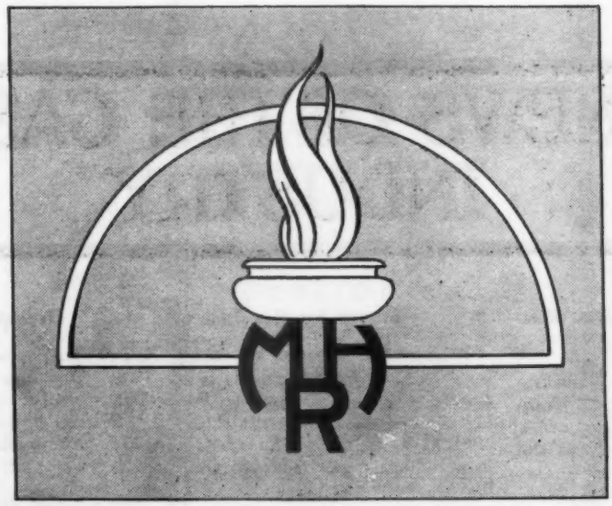
Secretary Prichard, of the Ironton (O.) Company, writes that a New York party—a Mr. Dunham—has just obtained a franchise to operate an electric street railroad in that city, the grantee, however, having an eye also to the possibility of dividing the street lighting with the Ironton Gas Company. Further on Mr. Prichard says: "I do not worry about it, for I would rather have 50 gas cooking stoves than the 150 public lamps. Street lamps are sources of a very large proportion of the leakage account of a gas works. I wonder that some of our neighbors make such desperate fights to retain them. The enemies so made will not be compensated for by all they gain. I am a 'peace' man, with peculiar notions about making friends of your consumers, instead of enemies, and have always fought the idea of running after a city council. You can generally gain more by letting them run after you, and keeping a stiff upper lip. The city expects to submit to the voters, at the April election, the question whether they shall buy a plant and operate it themselves or not. Now $40,000 for a schoolhouse and $20,000 for an electric light plant, besides several heavy new street levies, coupled with a $71,000 fire a few weeks ago, are pretty good doses for one year—and an off year at that." It would seem so, Brother Prichard.

SIXTY YEARS AGO

We are in receipt of the reports of the engineer and cashier of the Philadelphia Gas Works for 1867, and briefly state their main features.

The total quantity of gas made was 981,642,000 cubic feet, the maximum daily consumption being 4,504,000 cubic feet. The fuel percentage was 54 8-10 of the total production.

The average yield per ton was 9,519 cubic feet. Both clay and iron retorts; 92,660 tons of coal being carbonized in the irons, and 10,455 in the clay. By some peculiarity of management, the yield per ton was only 9,039 cubic feet from the clays, against 9,574 from the irons.



HOW DOES CLOCK CONTROL AFFECT THE MORNING PEAK?

— *a restatement of an important gas heating principle*

Word-of-mouth advertising, fostered by years of consistent advertising in national magazines, has emphasized the sales value of clock control.

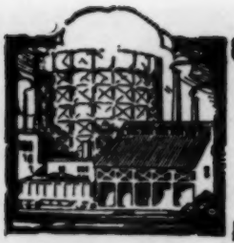
Today three million people are enjoying warm rooms to dress in, because Minneapolis-Honeywell clock controls wake up the fire automatically. This feature is so firmly established as an integral part of American living standards that it is universally employed as a powerful argument in selling gas heating plants and keeping them sold.

Clock control, however, has far deeper significance to gas company executives who study house heating in relation to load problems and the rate structure. It means that on each individual installation, the heating-up period starts about two hours before the housewife begins cooking breakfast. Normal daytime demand for heating when the cooking load comes on, is an advantage to be considered in estimating the load factor for your particular system. Ask us for details.

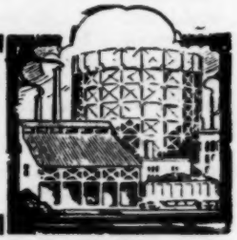
MINNEAPOLIS
REGULATOR COMPANY
HONEYWELL

Executive Offices: Minneapolis *Factories:* Minneapolis and Wabash, Ind.

AUTOMATIC CONTROLS FOR HOUSE HEATING



NEWS OF THE GAS INDUSTRY



Interesting Figures in President Macbeth's Report

At the annual stockholders' meeting of the Southern California Gas Company the report made by President A. B. Macbeth covers the purchase of the Midway Gas Co., Valley Natural Gas Company, Central Counties Gas Company, Hanford Gas and Power Company and the River Bend Gas and Water Company, and their consolidation with the Southern California Gas Company into a corporation having properties valued at over $60,000,000. In addition to mentioning the change from mixed to natural gas in Los Angeles, the report states that there was approximatelv $3,600,000 expended in extensions and betterments. There was a gain of 15,101 meters during the year, bringing the total to 208,604. Two hundred and sixty-two miles of mains were laid, making a total now in operation of 4,004. In addition to improvements in the manufacturing and pumping facilities at the Colton plant of the company, an additional eight-inch high pressure line was laid from Colton to San Bernardino, a line from Redlands to Beaumont, a sixteen-inch line from Calabasas to Los Angeles, and transmission mains were placed in operation from Huntington Beach and Seal Beach to connect with lines to Los Angeles.

The first financial report of the consolidated properties gives: Gross revenue for the year 1927 of $15,893,090.57; operating expenses and taxes, $10,298,192.80; bond interest and deductions during the year, $1,417,645.30. The balance available for dividends on stock and surplus for the year, $2,771,890.61.

To Vote on Gas Franchise

The special election that was to have been held at Pueblo, Colo., March 6, in which the Pueblo Gas and Fuel Co. will ask for a twenty-year franchise and the approval of the voters to accept natural gas at the same rate as Denver, has been postponed until April 6. The postponement was made on the request of the company, so that all voters who failed to vote in the last election could register and to familiarize themselves with the propositions to be voted on.

Survey for Gas Line

Preliminary surveys are being made for a gas line from the fields in the Panhandle of Texas, through the Pecos Valley of New Mexico, to El Paso, Texas' farthest western city, hundreds of miles from natural gas. The distance of the line is about 400 miles.

The West Texas Gas Co., subsidiary of the Prairie Oil & Gas Co., is making the survey, and definite announcement of the progress is expected witnin a short time.

This line, when completed, will be the fourth from the Panhandle fields, the West Texas Company having completed its line to the South Plains and the Empire Oil and Gas Company to Wichita, Kan. The Prairie Oil and Gas Company is now working on a line to Denver.

U. G. I. Sells Holdings in Petersburg Gas Company

The United Gas Improvement Company recently announced that it has sold its holdings in the Petersburg Gas Company, Petersburg, Va., to Stevens & Wood, Inc., and associates, of New York. The price was not made public. It is expected that the new owners will take possession of the property within the next thirty days.

It is understood that Stevens & Wood will expand the operation of the Petersburg Company in its local field and will build an extension to Hopewell, Va. That rapidly growing community will be served with gas, under the terms of franchise recently granted by the Hopewell Council to the Old Dominion Gas and Electric Company, an affiliated organization of Stevens & Wood, Inc.

The Petersburg Gas Company was chartered as a Virginia corporation in 1850 and during the Civil War the stacks of the plant were attractive marks for Federal gunners. It supplies Petersburg, which has a population of approximately 40,000. Controlling interest in the company was owned by the American Gas Company and it came into the U. G. I. system when the U. G. I. and American Gas Companies merged.

Demonstration of Gas Refrigerator

Approximately thirty-five science instructors in St. Louis high schools recently attended a demonstration of the gas refrigerator in the Home Service Auditorium of the Laclede Gas Light Company.

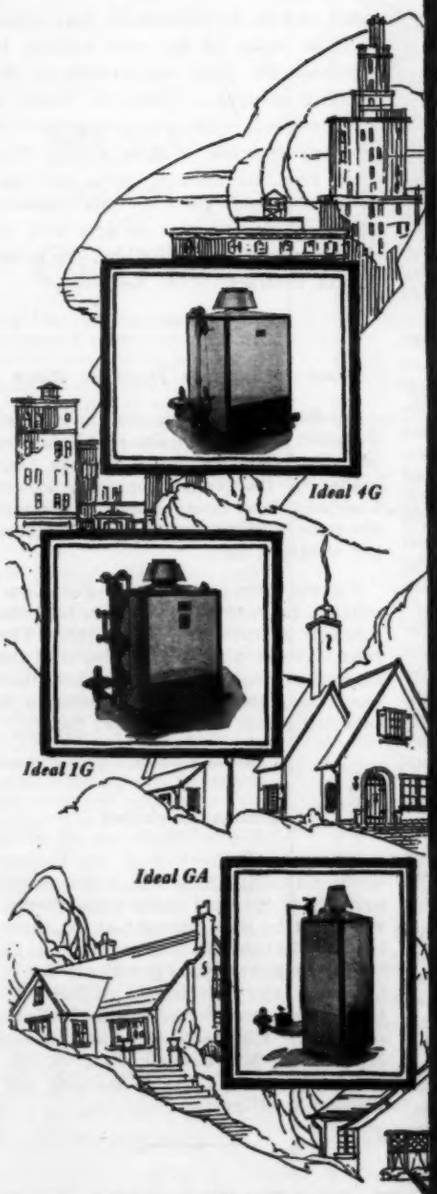
The demonstration was conducted by Dyke Wilson, chief chemist of the company, who formerly was an instructor at the Rolla School of Mines and Metallurgy.

Since this meeting, which was arranged by the Commercial and Public Relations Department of the gas company, requests have been received for similar demonstrations before the Academy of Arts and Science and the science classes of two local high schools during school hours.

The plan to interest the instructors in the gas refrigerator, from a scientific standpoint, was carefully worked out by the company representatives. Permission from the Board or Education was first secured and then a letter in the form of an invitation was written to each instructor. Colored diagrams of the working unit were prepared, together with a complete typewritten description of the functions of the device. A refrigerator in operation was on display in the auditorium at the time of the demonstration and Mr. Wilson used a dismantled unit in further explaining the device.

Le Mars Plant Acquired by Great Lakes Utilities

The Le Mars (Iowa) Gas Company has been acquired by the Great Lakes Utilities Corporation of New York and will be under direct supervision of the Des Moines, Ia., main office. Plans for the future, however, contemplate establishment of a western division main office in Le Mars, the western group including properties from Chicago west and south to Scottsbluff, Neb. L. E. Thompson, associated with the Le Mars plant five years, has been appointed general manager of the western division and will have charge of the Le Mars unit.



AN IDEAL GAS BOILER *for* EVERY *heating need!*

For cottages or bungalows—with or without basements—an Ideal Arcola Gas Heater!

For small or medium-sized homes —Ideal 1G Gas Boiler!

For larger homes and buildings— Ideal 4G Gas Boiler!

For office buildings, big apartment houses, hotels — Ideal 4G Gas Boilers in multiple units!

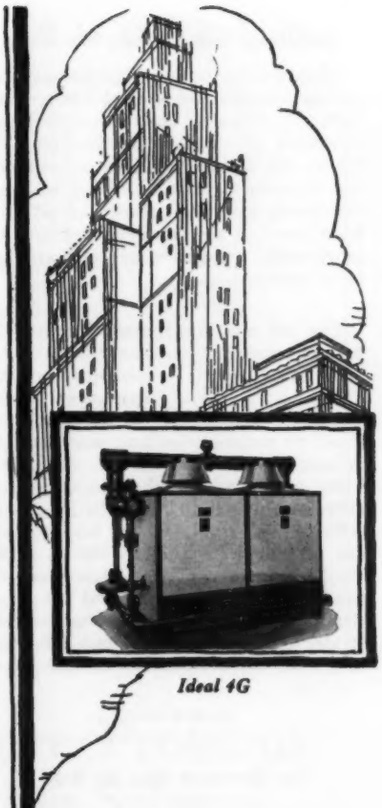
All these boilers are useful for large-volume hot-water supply and industrial applications.

THIS whole family of perfectly-designed gas boilers offers you *exactly* the right heating plant for *every* job on which you want to figure.

Designed and manufactured by the American Radiator Company, it is the latest triumph of their boiler engineers.

Ideal Gas Boilers are made available to you without delay by strategically-located distribution centers.

We have prepared for you a plan book covering every detail of selling plans that actually *work.* Won't you send for this complete and practical information?



IDEAL GAS BOILERS

Product of AMERICAN RADIATOR COMPANY *Gas Utilization Dept.*

Write to AMERICAN GAS PRODUCTS CORPORATION, *Distributors*

376 Lafayette Street, New York City

Gas Near Bell Springs, Wyoming

Deep drilling in search of oil near Bell Springs, Wyo., which is 16 miles northwest of Rawlins and some 25 miles southeast of the Lost Soldier oil field, led to the discovery of gas in commercial quantity in 1924. Drilling has been continued, and good shows of oil have been found in several wells, but thus far marketable quantities of oil have not been obtained.

The oil and gas possibilities of the area in which the wells have been drilled were investigated by geologists of the Geological Survey, Department of the Interior. The area examined contains about 80 square miles and was found to include two anticlines—the Separation Flats anticline and the Buck Springs dome—on which all the wells have been drilled. The results of the investigation are presented in Bulletin 796-D of the Geological Survey, that describes the two anticlines mentioned and the other structural features and the rock strata. It also gives suggestions with reference to further explorations for oil and gas.

Gas Company May Be Sold

Regardless of the fact that the first venture of the Public Service Company of Colorado to acquire by purchase the municipal owned gas plant of the city of Colorado Springs was met with a refusal by the city fathers, recent events may cause a change of decision. After the city declined to sell, all of the suburbs just outside of the Springs contracted with the Public Service Co. to supply them with natural gas just as soon as the pipe line from Amarillo, Tex., is in operation. Now the city fathers are again asked to set a price on its gas plant, the Public Service to name a rate for natural gas and purchase the city's gas plant.

Home Economics Short Course to Be Given at Iowa State College

The second home economics short course in gas and electrical equipment will be held in the Iowa State College March 21-24, with Mrs. Vivian Brashear and Miss Harriet Brigham of the home economics division and Prof. Frank D. Paine of the engineering extension department in charge. Special attention will be directed to the homehakers' problems and the sales organization supplying equipment. A large exhibit of equipment will be shown and demonstrated at the school. Advanced work for last year's attendants will be arranged.

Bill Requiring Utility Employees to Present Identification

Under the provisions of a bill introduced in the Assembly, Albany, N. Y., the public service commission law is amended by requiring employees of telephone, telegraph, gas, electrical and steam corporations called to enter premises of another in course of employment to be suitably uniformed and wear a badge and carry identification card. The bill is aimed to prevent burglars disguised as public utility employees obtaining a ready entrance to premises.

Mid-West Industrial Gas Sales Council

A gas sales council to handle industrial problems only was formed in Chicago on January 27, 1928. This council will be a part of the American Gas Association and conduct its work through the Industrial Gas Section. The purpose of the organization is to hold round-table discussions on the various problems that arise in the industrial gas field. The territory covered is unlimited and those interested are requested to send in their names for membership. Programs and notices of meetings will be mailed to members. The council will meet at least four times a year. The officers elected for the present year are:

A. F. Mitchell, chairman, Northern Indiana Public Service Company, Hammond, Ind.; Wm. F. Miller, vice-chairman, Public Service Company of Northern Illinois, Chicago, Ill.; C. B. Mershon, secretary-treasurer, Northern Indiana Public Service Company, Hammond, Ind.

Resuscitation Demonstrated At Haverhill, Mass.

A moving picture of methods of artificial respiration in cases of gas asphyxiation, electric shock or drowning was shown to the student body of Haverhill High School at the chapel exercises, followed by an actual demonstration by the first aid team of the Haverhill Gas Company. An explanation of each requirement was given by V. G. Gallison, who addressed the student body, while the actual work of resuscitation was carried on by Frank Cronin, George Munt, Ralph Osgood, John Lewis and Howard Chamberlain, who acted as patient. Each member of the team was dressed in white uniform for the demonstration.

An appreciation of the courtesy of the Gas Company's First Aid Team in giving this educational and beneficial demonstration was voiced by Principal Arlington I. Clow.

Voters Approve Franchise

Voters of Muscatine, Ia., at a special election February 21 approved the gas franchise sought by the Iowa Electric Company of Cedar Rapids by a five to one majority. The present gas franchise held by the Muscatine Lighting Company does not expire until next year and it is understood that effort will be made by the new holders to purchase the plant and system of the lighting company. John A. Reed is vice-president and general manager of the new franchise holding utility. The new franchise holders have not announced definite plans for establishment of their plant here. A new rate of $1.60 per 1,000 cubic feet is incorporated in the contract.

Want to Increase Domestic Rates

Application for permission to increase domestic gas rates in Ranger, Texas, 10 cents per thousand cubic feet has been made by the Texas-Louisiana Power Company, local distributors. If granted, the raise would make the rate 70 cents per thousand feet.

Figures were presented the City Commission to bear out the claim that the company operated at a loss in 1927. The raise was asked for six months, with the agreement that the former rate then would be restored. The commission is expected to act within a short time.

Officers Re-elected

Officers and directors of the Indianapolis Gas Co., all of which company's property is operated under a ninety-nine year least by the Citizens Gas Co., have been re-elected. They are: William G. Irwin, Columbus, Ind., president; W. T. Cannon, vice-president; Arthur V. Brown, treasurer, and William J. Yule, secretary. Directors are: Mr. Irwin, Mr. Brown, Mr. Cannon, P. C. Reilly, Frank Stalnaker, Louis B. Ewbank and William R. Higgins.

To Spend Half Million in Improvements

The Decatur, Ill., division of the Illinois Power & Light Corporation is scheduled for $500,000 improvement projects during the present year, it was announced. In the gas division extension of 16-inch mains from the plant to 22nd street, giving improved service to the entire east side of the city, is principal improvement scheduled.

STEAM FOR HEAT — GAS FOR FUEL

HOW *it's done by* CLOW

Clow Gasteam Radiators supply *real* steam heat, with all its advantages and none of the difficulties.

Because Clow burners are enclosed, the fire hazard is eliminated. Clow Radiators are approved by the Underwriters' Laboratories.

Little or no servicing is required on Clow Gasteam Radiators. They are solidly built, permanently attached, and cannot be accidentally upset.

Clow Gasteam Radiators spread heat over a large area, as is necessary in almost all cases of commercial heating, rather than intense heat immediately surrounding the radiator.

Clow Gasteam Radiators can be used in exposed quarters. Freezing the water cannot harm them.

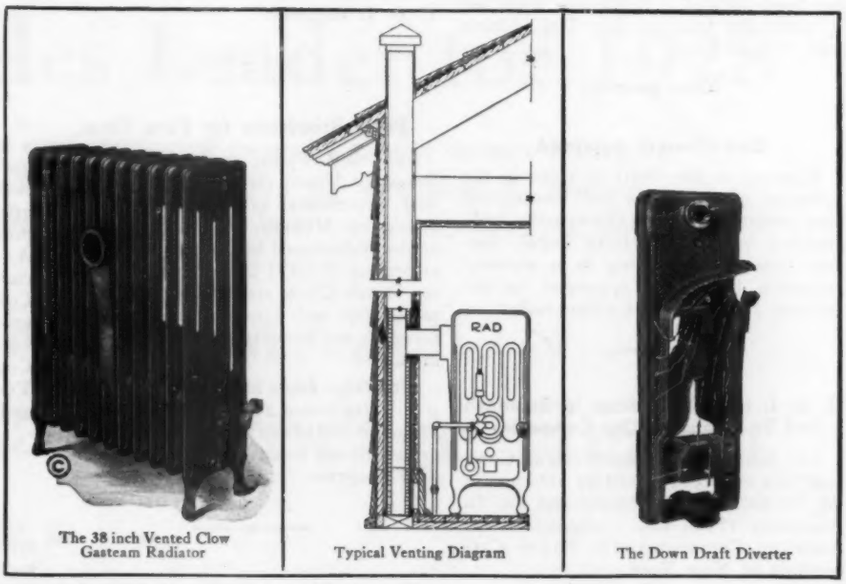
Clow has been building Gasteam Radiators for 20 years. The annual sales are now bringing more than a billion cubic feet of *new* heating load to the gas companies each year.

Warehouse stocks are maintained at 21 distributing points.

The Clow Vented Gasteam Radiators end the moisture problem that has held back gas heating in many sections of the country.

Our new Clow Gasteam Vented Catalog should be read by officials of Gas Companies, architects, steam fitters, plumbers and others interested in the proper venting of any gas appliance.

Write for your copy today.



The 38 inch Vented Clow Gasteam Radiator

Typical Venting Diagram

The Down Draft Diverter

Licking the Moisture Problem —Swelling Heating Sales— with Clow *Vented* Gasteam Radiators

Clow Vented Gasteam Radiators *end* the moisture problem that has held back gas heating in many sections of the country.

The water vapor, produced by the burning of gas, is carried outside the building through the vented sections — as shown in above diagram.

The patented Down Draft Diverter is cast integral in the vent section of all Clow Vented Radiators. Combustion is complete at all times.

Clow Vented Gasteam Radiators can mean bigger gas heating loads for gas companies especially in sections of the country where gas heating involves the moisture problem.

Send for our catalog, showing how Gasteam can mean bigger heating loads for gas companies; and how Gasteam is heating buildings of all types, in all sections of the country.

JAMES B. CLOW & SONS
201-299 North Talman Avenue, Chicago

CLOW A. G. A. and Underwriters' Laboratories Approved. GASTEAM

STOCKED IN EVERY SECTION OF THE COUNTRY

Gets Long Time Gas Franchise

The Houston Natural Gas Company has been granted a thirty-year franchise to serve the town of Bay City, Texas, with natural gas.

Rate Changes Approved

Changes in the limits of steps in the schedule of gas rates for commercial and industrial uses at Newcastle, Ind., supplied by the Interstate Public Service Company, resulting in a material reduction have been approved by the Indiana Public Service Commission.

U. G. I. to Sell Holdings in Savannah and St. Augustine Gas Companies

The United Gas Improvement Company has arranged to sell its holdings in the Savannah Gas Company and the St. Augustine (Fla.) Gas Company to the American Commonwealths Power Corporation of New York.

The sale of these plants is in accord with U. G. I. policy to dispose of isolated properties and to so group its holdings to permit their most economical operation.

The St. Augustine Gas & Electric Light Company was one of the first companies to come under U. G. I. management.

Personals

Taylor Elected President of Philadelphia Electric Company

William H. Taylor, vice-president in charge of operations and maintenance of the United Gas Improvement Company, has been elected president of the Philadelphia Electric Company. He succeeds Walter H. Johnson, resigned.

Arthur W. Thompson, president of the United Gas Improvement Company, was elected chairman of the board. Mr. Johnson was elected assistant to the chairman. Samuel T. Bodine, chairman of the U. G. I. Board, was elected a director.

Immediately after the announcement of his election to the presidency of the Philadelphia Electric Company, Mr. Taylor, who has had twenty-five years' experience in the public utility industry, said he had resigned as vice-president of the U. G. I.

Mr. Taylor began his public utility career twenty-five years ago, following his graduation from Stevens Institute of Technology, and a brief connection with the Link Belt Company as engineering draftsman. Practically his entire business experience has been with U. G. I. interests.

Paige Broadcasts for First Time

Clifford E. Paige, vice-president of the Brooklyn Union Gas Company, had his first experience with an invisible audience on Monday, February 27, when he was introduced before the microphone at Station WLTH in the Leverich Towers Hotel, Clark and Willow Streets, in connection with a special program sponsored by the Brooklyn Chamber of Commerce.

Mr. Paige made his radio debut at 9.10 p. m. He chose as his subject, "Gas as a Factor in Industry." His address was preceded and followed by a special musical program.

Whipple Elected Chairman of Board

Henry S. Whipple, manager of the Rockford (Ill.) Gas Light & Coke Company, whose designation was recently announced, is scheduled to be elected chairman of the board of directors of the Central Public Service Company of Chicago, of which the Rockford unit is a subsidiary, according to an announcement by C. R. Horning, vice-president of the Central Public Service Company. Mr. Whipple's successor in Rockford has not been announced. His resignation is effective May 1 or earlier, if convenient to the company. Mr. Whipple was manager of the Rockford utility interests 38 years, and will continue to make his home in Rockford, where he will direct the company's affairs with many details heretofore under his supervision delegated to subordinates.

Barnitz Tendered Dinner

Mr. Frank R. Barnitz, recently elected president of the Central Union Gas Company and of the Northern Union Gas Company, Borough of the Bronx, New York City, was tendered a complimentary dinner on Saturday evening, February 4th, at the Concourse Plaza, 161st Street and the Concourse, New York City, by his former associates of the Consolidated Gas Company of New York and his present associates of the Central and Northern Union Gas Companies.

Mr. Barnitz was formerly general commercial manager and assistant secretary of the Consolidated Gas Company of New York. He entered the employ of the Consolidated Gas Company more than thirty-five years ago as junior clerk in the old Hester Street District Office. Mr. Barnitz has been closely connected with the development of the gas industry from the old flat flame burner to the modern industrial, hotel and large domestic gas appliances.

Colonel Oscar H. Fogg, vice-president of the Consolidated Gas Company, in a few chosen words presented to the guest of the evening a beautiful platinum watch as a token of the esteem and affection in which he is held by his former and present associates. Mr. Gilbert A. Burrows, assistant general commercial manager of the Consolidated Gas Company, presented a beautiful engrossed parchment from the general office and district office employees of the Consolidated Gas Company of New York, conveying their sincere affection and regard.

Gas Executive Honored

E. K. Hartzell, assistant publicity director of the Public Service Co. of Colorado, was elected chairman of the Eleventh District of the International Advertising Association, at its annual meeting in Denver, February 18. The district is composed of Colorado, Wyoming, Utah, Nevada and New Mexico.

Frank R. Jamison, publicity director of the Public Service Company of Colorado, was elected a director of the Colorado Motor Club.

Floyd F. McCammon Promoted

Floyd F. McCammon, who has been salesmanager of the Public Service Co. of Colorado for several years, and an employee of the company since his graduation from Colorado College eleven years ago, was appointed assistant general superintendent of the company, effective February 1.

Merkt Gives Lecture

"Gas—the Cleaner Up" was the subject of a lecture given on February 14 before the evening students of P. S. No. 15, State Street and Third Avenue, by Theodore B. J. Merkt, industrial engineer of the Brooklyn Union Gas Co.

Mr. Merkt likened modern gas appliances to the "clean up" men used in baseball to score players who have gotten on base. He cited the regulated gas range and housheating plants, the gas laundry, dryer, the ironing machine, the incinerator and gas refrigerators as products which have brought about healthier living conditions.

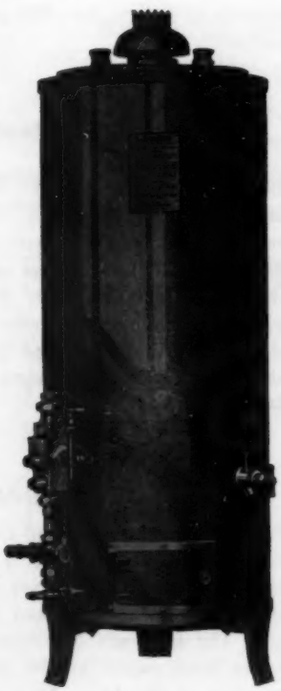
Mr. Merkt's lecture was illustrated by lantern slides showing modern gas equipment. The slides were taken in a number of Brooklyn homes.

The Sales Leader for 1928

developed and perfected to assist you to secure a large volume of "satisfied" users of gas heated, always-ready, "turn a faucet" hot water service, is the

KALAMAZOO
Automatic Storage Heater

It really does excel in – –



Handsome Appearance
Low Operating Cost
Absolute Safety

Gives pleasing service as well as low operating costs. No waiting for hot water to cause complaint.

EVERY ADVANTAGE IN LOAD DISTRIBUTION and in meter and gas service costs, is provided.

HUMPHREY BUILT!

THREE SIZES — LOW LIST PRICES
BIG DISCOUNT —
A. G. A. APPROVED

Has –

Humphrey Snap Thermostat
Humphrey Safety Pilot
Pressure Relief Valve
Drain Cock
Copper Cold Water Intake
Brass Connections
Highly Tested Boiler
Rock Wool Insulation

There are other types and sizes to fit any special or unusual need.

HUMPHREY COMPANY

KALAMAZOO (DIV. OF RUUD MFG. CO.) MICHIGAN

Obituary

Funeral Services for George W. Gatehouse

Funeral services for George W. Gatehouse, who for the past seventeen years was head of the purchasing department of the Brooklyn Union Gas Company, were held February 14 at Fairchild Chapel, 86 Lefferts Place.

Mr. Gatehouse, who died suddenly Saturday at his home, 769 St. Marks Avenue, entered the gas business in 1880, when he obtained a position with the old Fulton Municipal Gas Company. In 1895 he joined the forces of the Brooklyn Union and served with that company until 1899. In that year he went with the East River Gas Company, where he remained until 1901, when he entered the employ of the New Amsterdam Gas Company. In 1904 he returned to the Brooklyn Union and served in various capacities until he was appointed head of the purchasing department in 1910.

Mr. Gatehouse was well known in the gas industry. He is survived by his wife, Kathryn.

Trade News and Construction

Western Gas Construction Company to Install Fifteen Million Capacity Naphthalene Scrubber

The Western Gas Construction Company has been awarded the contract for furnishing and installing a fifteen million (15,000,000) cubic feet per day Koppers type naphthalene scrubber, with all necessary pumps and auxiliary equipment, for the Citizens Gas Company at Indianapolis, Ind., for erection at their Prospect Street plant.

Contract has been awarded for furnishing new purifier covers for the Citizens Gas Company at Salisbury, Maryland. With the installation of these covers the present boxes will be converted from wet seal to dry seal and will at the same time be deepened.

The Western Gas Construction Company has entered into a contract with E. L. Phillips & Company, engineers of New York, to furnish considerable new equipment for the plant of the Queensborough Gas & Electric Company at Rockaway Park, Long Island. The new equipment will consist of a new eleven-foot diameter dome top generator complete, angle connections with large dust pocket, larger connections between the carburetter and superheater, also off-take piping to a new tar batter with necessary equipment for operating the set as a by-pass machine, blast valves with safety blocks, Western automatic control and thermo control for maintaining the heats in the carburetter and superheater are also to be furnished. All of this equipment will convert one of their present machines into a modern, up-to-date water gas set.

Contract has been awarded for furnishing and installing a new generator, tar batter and auxiliary equipment for water gas sets, also new steel welded gas off-take piping with connections to present relief holder, scrubbers, condenser and exhauster, for the Cape May Heat and Light Company, through the Southern Cities Utilities Company of Philadelphia, Pa.

Contract has been awarded for furnishing and erecting a ten thousand (10,000) cubic feet single lift gas holder at the plant of the Zenith Furnace Company, Duluth, Minn. This holder will be of special design and will throw 12-inch water column pressure.

American Meter Company Appoints McKean Manager

The American Meter Company has announced the appointment of Mr. Norton McKean as manager in charge of D. McDonald & Co. of Albany. Mr. McKean has been associated with the American Meter Company for the past sixteen years. He received his preliminary meter training with the National Tufts Meter Works of American Meter Company until he was appointed three years ago assistant manager of the Albany factory. Mr. McKean fills the vacancy caused by the resignation of Mr. Frederick McDonald, when the latter became vice-president of the New York State National Bank.

Mr. Arthur E. Norton, formerly assistant manager of the Nathaniel Tufts Meter Works of the American Meter Company, has been appointed to fill the position of manager of this factory. Mr. Norton brings to his works the experience of many years of activity in the meter business, and of close contact with the gas industry in New England. The position of manager of the Boston factory was formerly held by the late Mr. H. A. Norton.

Mr. John Van Norden, formerly a marketing counselor with the McGraw-Hill Publishing Co., Inc., has been appointed an assistant secretary of the American Meter Company. He will be located at this company's general office at 105 West 40th Street, New York.

Twenty-sixth Annual Meeting of District Managers

A four-day meeting of the Pittsburgh Equitable Meter Company district managers has just been completed. These annual meetings are held with the men so that they will be in a better position to serve their customers in the most efficient way and know at all times what is being improved upon at our plant and learn about any new products.

Due to the improvements in design and construction, as well as the development of several new products in both the gas and water divisions, some very interesting views were discussed.

The meeting closed with the annual banquet, which was attended by all department heads of the production departments as well as the office and sales department.

Botfield Appoints Southeastern Representative

Botfield Refractories Co., Philadelphia, Pa., manufacturers of Adamant Fire Brick Cement, announces the appointment of Mr. Ires Prosser as Southeastern representative. Mr. Prosser's territory will embrace the entire Southeast from North Carolina to San Antonio, Texas. His headquarters will be Atlanta, Georgia.

Will Erect Auxiliary Holder

The Iowa Light & Power Company has announced plans to erect a 114,000 cubic feet capacity gas storage tank as auxiliary supply for Ames and Nevada, Iowa. The tank will be located on a five-acre tract owned by the gas concern west of the Iowa State College campus, half a mile east of Ontario, Iowa. It will be 50 feet in diameter, 40 feet high and will cost $25,000. J. H. Ainsworth, local manager, explained that Ames and Nevada are now supplied by the Boone plant of the corporation, the new tank being a protection against interrupted supply. New mains, costing $10,000, are scheduled to be laid in Ames also this year.

SKIP THE DANGER OF FIRE

The draft is up the elevator hatch.
Gas and dust accumulate up the hatch.

A SPARK CAN [AND WILL] BLOW YOU OUT OF BUSINESS.

Fire Insurance Companies report, "1927 has been a bad year," and are cutting commissions.

Electricity has been a Great Incendiary.

KEEP ALL SPARKS OUT OF THE HATCH BY USING RIDGWAY STEAM-HYDRAULIC ELEVATORS.

The man who has steam or compressed air deserves small sympathy and gets burned out through his elevator.

WHEN HE CAN HAVE RIDGWAY ELEVATORS AND BE AT PEACE WHEN THE FIRE WHISTLE BLOWS.

As the Side Show Barker yells, "This one feature alone is worth the full price of admission."

If you doubt it, ask this bunch; they don't have elevators to sell.

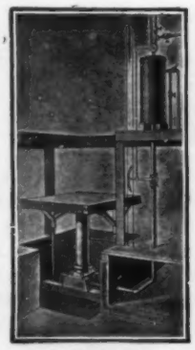
Welsbach Co.	Fall River Gas Co.	Vulcanized Rubber Co.
Diamond Match Co.	Hartford Gas Co.	Miller Rubber Co.
Sherwin, Williams & Co.	Buffalo Gas Co.	Cataract Rubber Co.
Barrett Co.	Springfield Gas Co.	B. F. Goodrich Co.
Anchor Color & Gum Works	Northern Indiana Gas Co.	Firestone Tire & Rub. Co.
Crocker-Burbank & Co.	Croninger Pack. Co.	Joseph Benn & Sons
Joliet Paper Co.	Val Decker & Co.	James Irving & Son
Schmidt & Ault Paper Co.	Peters Packing Co.	Folmer Clogg & Co.
Thames River Paper Co.	Roth Packing Co.	Lowell Bleachery
River Raisin Paper Co.	Swift & Co.	Elizabeth Mills
	Westinghouse Elect. Co.	General Electric Co.

It is concerns like this that write order after order.

"HOOK 'ER TO THE BILER"

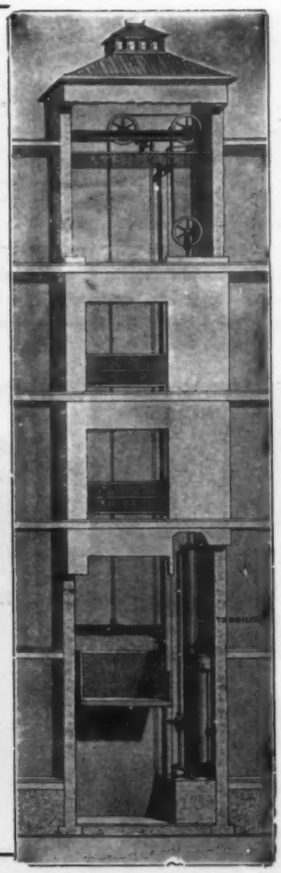
Craig Ridgway & Son Co.

Over 3,000 in daily use. **COATESVILLE, PA.**



Direct Acting

Double Geared



SUPERIOR

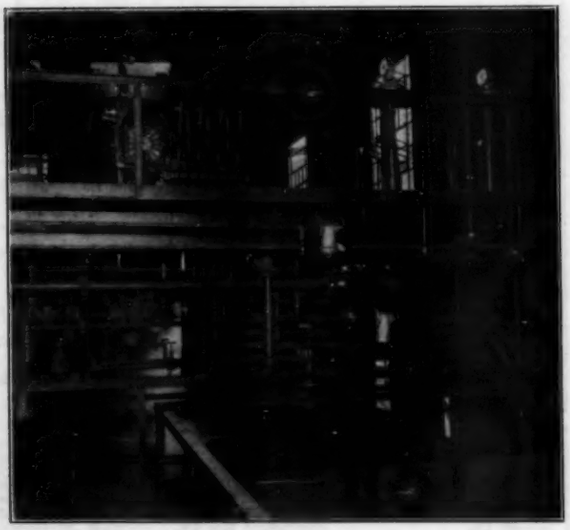
Gas Meters
Provers
Service
Cleaners
Diaphragms

SUPERIOR METER CO.
167 - 41st Street
Brooklyn, N. Y.

Water Gas Machine Erected in 13 Days

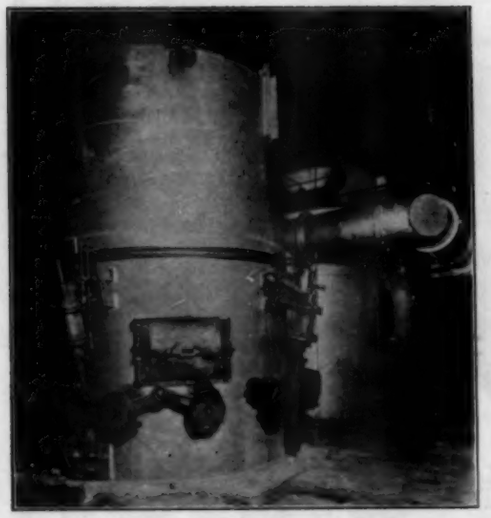
A Steere water gas machine with backrun, completely erected in 13 days at the plant of the Illinois Power Company, Springfield, Ill., will be in operation during the convention of the Illinois Gas Association, March 14-15.

The Semet-Solvay Engineering Corporation was given an order for a machine 10′ x 10′ x 10′ in size, with instructions to erect it on the same spot where an old 8′ 6″ machine stood. After the old machine was taken out the foundations were rebuilt so that the larger shells would line up with the old operating floor levels. It was necessary to complete the work in the shortest possible time, as there was only one other machine to carry the load during the interval.



Above—Automatic Control Piping

Left—Operating floor. Foul main is at left. Superheater is shown equipped with Steere water sprays for making process steam for backrun by using waste water and effluent of plant. Shallow gutter at top of superheater shell catches stack condensate, draining it to seal pot and preventing soiling of the shell.



View of clinker floor, finished machine, showing mechanism for operating rolling grates. Grate segments are rotated by hydraulic cylinder, shown at left. Backrun piping shown at right.

As a preliminary to record time construction work, every piece of material that went into the job was delivered and checked. Part of a wall was removed to provide an exit from the water gas building for the old shells and an entrance for the new ones. As the roof structure could not be used for hoisting, the erecting crew employed gin poles for placing all the larger parts of the machine.

The installation contains a number of advanced features. This is the first water gas machine in Illinois to be equipped with the Steere Grate Poker and Rolling Grates. They are hydraulically operated from the same system that controls the remainder of the gas making apparatus. The poker is located in the ash pit and at intervals is raised vertically through the center of the fuel bed. It breaks up clinker and blow holes and crowds fuel against the side walls where heats are highest. Clinker is dropped to the grates where the rotating motion of the segments grind it up and remove it from the generator.

Notwithstanding the fact that the machine varied in several ways from standard specifications, the erectors had everything completed and ready for the drying out fires in 13 days. Absolute accuracy in all fabricating enabled the work to progress day and night without delay or readjustment.

"Science surpasses the old miracles of mythology."—EMERSON

The Research Laboratory of American Stove Company, housed in its own building located at 4931 Daggett Ave., St. Louis, Mo., is the Finest Owned by Any Manufacturer of Gas Appliances.

AMERICAN STOVE COMPANY, *801 Chouteau Avenue*, St. Louis, Mo.

LARGEST MAKERS OF GAS RANGES IN THE WORLD

These are the Six Famous Brands of Red Wheel Gas Ranges:

DANGLER · CLARK JEWEL · QUICK MEAL · DIRECT ACTION · NEW PROCESS · RELIABLE

LORAIN

Capitalize the New Vogue for COLOR

Humphrey Radiantfires are now ready in new finishes to meet present demands for home decoration in color.

Beautiful Finishes in Color and Flemish Brass are now ready

Models 20 and 31 are supplied in rich maroons, beautiful greens and walnut browns that are bound to be popular.

Then, too, you can get Models 25, 30 and 35 in most attractive Electro-Plated Flemish Brass finishes at no added cost.

We suggest that you anticipate your fall demand for our medium and low priced Radiantfires in the new finishes by making a small selection of these new numbers to fill out your present stock of Radiantfires and enable you to cash in on the present color trend without requiring a large additional investment.

But more important — having the stock now will give you a line on what your public will be asking for this coming fall when the season is really open.

The HUMPHREY

No smoke—No odor
No ashes—No dust

Radiantfire

TRADE MARK REG. U.S. PAT. OFF.

If it isn't a Humphrey it isn't a Radiantfire.

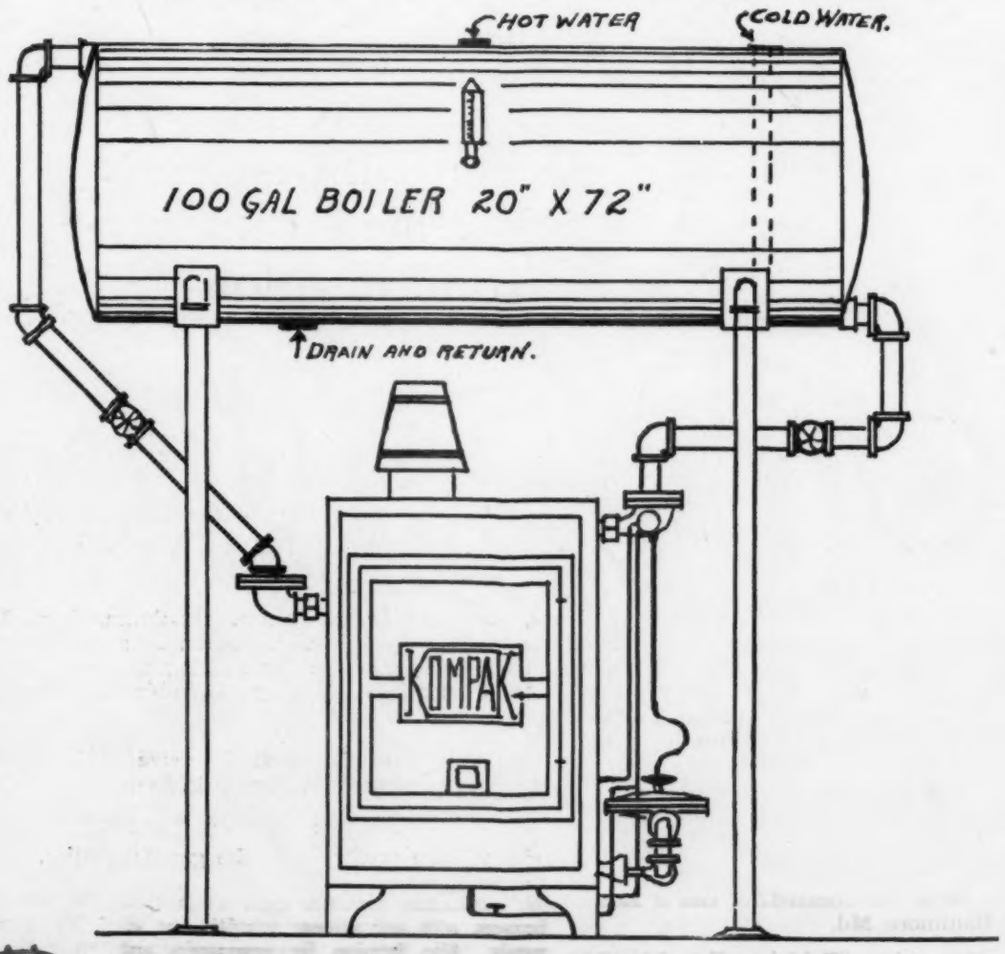
GENERAL GAS LIGHT COMPANY, KALAMAZOO, MICH.
New York · 44 West Broadway San Francisco · 135 Bluxome Street

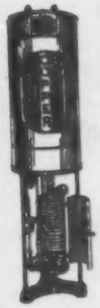
THE KOMPAK CO.

Automatic Thermostatic Gas Water Heaters

NEW BRUNSWICK
NEW JERSEY

The Kompak Type "H" Storage System





Here is a complete unit, factory built, with 250 lb. test copper boiler, all brass fittings and valves, with covering, made in four sizes, for large homes, apartments, hotels, etc.

Tanks may be connected with the steam heater system for hot water during the winter, making an ideal large volume water heating installation.

THE KOMPAK COMPANY,
NEW BRUNSWICK, N. J.

KOMPAK

Co-operation That Pays!

The more emphasis placed on the convenience, dependability, ease of operation and control and ultimate economy of Gas as a heating medium in the foundry and shops for processes requiring heat, the more profit accrues from the resulting increase in sendout, plus the profit on the sale of the furnaces and appliances.

Gas companies throughout the country, realizing this, are rapidly falling in line with this thought and are co-operating with us in many ways, one of which is the splendid display shown here in the window of the Consolidated Gas & Electric Co., of Baltimore, Md.

Under the caption, "Baltimore Foundries Melt Non-Ferrous Metals With Industrial Gas," are exhibited products of several representative Baltimore foundries using Monarch Furnaces.

Amongst the display are shown our Monarch Stationary No. 80 Pit Crucible Furnace, for melting brass, bronze, aluminum, ferro-alloys, gold, silver, etc. Also the Monarch Iron Pot Tilting Furnace for melting aluminum, and a Monarch Stationary Crucible Furnace and crucibles.

Occasional window displays such as shown above and a permanent display in the company showrooms, cannot fail to stimulate interest in the increased use of gas for industrial purposes that will be profitable to the gas companies.

We manufacture numerous types of gas-fired furnaces, with and without crucibles, for all metals. Also furnaces for newspapers and printers; also core ovens, etc. They give maximum results at minimum cost; with a record of long years of successful experience and unsullied reputation behind them. And we will gladly give any assistance to further the installation of products comprising our line.

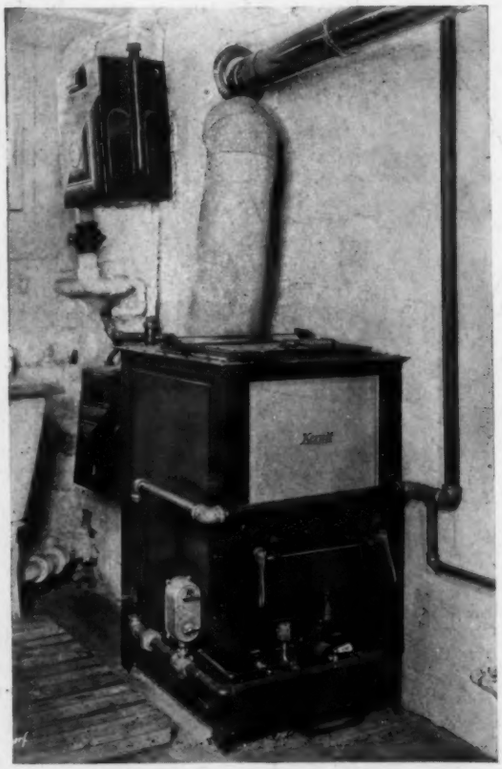
Be Sure to Write Today

THE MONARCH ENGINEERING & MFG. CO.

1206 AMERICAN BUILDING - BALTIMORE, MD.

Works: Curtis Bay, Md.

IN THE HOME OF A WELL-KNOWN GAS MAN



INSTALLATION IN THE HOME OF
A. E. FITKIN—ALLENHURST, N. J.

Kernit

GAS-FIRED INCINERATOR

The ever-increasing use of incineration units in apartment houses, hotels, clubs, hospitals and the better class of homes has created a widespread demand for a reasonably priced, efficient, gas-fired incinerator for household and small commercial uses.

Two essential features required in a well-designed and efficient gas-fired incinerator are:

1. **Rugged construction, to withstand severe usage and to eliminate any necessity for servicing.**

2. **Economy and thoroughgoing efficiency in operation . . . a unit that will completely consume the garbage and rubbish, and that will prevent all blanketing of gases, even though mishandled or overloaded.**

The KERNIT is built to meet these requirements.

It is a patented device, entirely different in its construction features from any other incinerator on the market, and has many unique selling points.

KERNITS produce a desirable addition to the off-peak load, and an attractive merchandising profit.

Equipped with Time-O-Stat and pilot lighter.

Light gray enamel finish—top, front and sides.

Burner capacity: No. 3—90 cu. ft., No. 4—100 cu. ft.

Weight (crated): No. 3—510 lbs., No. 4—650 lbs.

Made in three and four bushel sizes

PROMPT SHIPMENT AND DELIVERY

PRICES AND DISCOUNTS ON REQUEST

KERNIT INCINERATOR COMPANY
AMPERE, NEW JERSEY

MUELLER
MODEL "F"
Drilling Machines
Another product from the famous Mueller Line.
Drills ¼" to ½" holes in pipe under pressure

Drills Pipes

where space is small

Down under pavements—and in all those other tight places where back-breaking work was formerly necessary—just put the model "F" Drilling Machine on the pipe and your troubles are over. It does the job faster, even in cramped quarters. It's a smaller machine, designed to drill smaller holes—1/4 inch to 1/2 inch, inclusive. But it's built stronger where strength is needed and delivers the same high quality of work that you get from other Mueller machines.

By drilling pipes under pressure and doing it in less time, this smaller machine cuts wasted time and salary costs.

The Model "F" has a ratchet handle, boring bar and complete feed unit and yoke.

Write for full particulars

MUELLER CO. (*Established* 1857) **Decatur, Ill.**

Branches: New York, Dallas, San Francisco, Los Angeles

Canadian Factory: MUELLER, Limited, Sarnia

MUELLER

More Miles of Smithsteel Gas Line Pipe Ahead of Laying Crews

Capacity Increased to 6 *to* 8 Miles Per Day —16 to 24 inch

SMITHSTEEL GAS LINE PIPE

A. O. SMITH CORPORATION

Oil & Gas Field Products Division

General Offices—Milwaukee, Wis.

District Offices at New York, Pittsburgh, Tulsa, Houston, Los Angeles

Southwestern Style 1300 *Repair Ring as strip appears when cut off reel.*

1. *Style* 900 *Southwestern Special Braided Pure Jute.*
2. *Style* 1300 *Southwestern Self-Healing Repair Ring.*
3. *Lead or Cement.*

Southwestern Style 1300 *Repair Ring as it nests together when calked into joint.*

Stop Leaking Gas Joints With Southwestern Repair Rings

You not only need tight joints in new gas mains—but some way to repair leaky joints in old mains. The Southwestern Self-Healing Repair Ring is the answer. Remove the old joint materials with the Southwestern Joint Remover. The braided jute and repair ring is then wrapped around pipe and calked into bell without disturbing pipe in any way.

Southwestern Joint Remover—takes old materials out of joint in few minutes.

Southwestern Style 1300 Repair Ring is made of Paranite "C" compound the same as regular Southwestern Style 1100 Ring, which is used on new pipe line construction.

When calked into a bell-and-spigot gas joint and sealed by lead or cement from the oxygen of the air, the ingredients of the gas cause this ring to swell and thereby "self-heal" any leaks. We caution against the use of any ring not containing special self-healing rubber compound.

Ask For Sample

The Southwestern Repair Ring is being used either with braided jute and lead (cold strips or poured), or with jute and cement.

We are glad to send you sample rings for test purposes.

Write for Literature, Prices and Complete Information

Southwestern Pipe Joint & Engineering Company

1108-1110 5th Avenue, North, Birmingham, Alabama

(Factories Passaic, N. J.)

Settings that Swell Sales

This New England fireplace setting carries one back to the cozy homeliness and simplicity of "Down East" folks and is a faithful and pleasing replica of early days in that region.

Homestead Fires Sell on Sight - - -

Coalfire No. 13
List $50

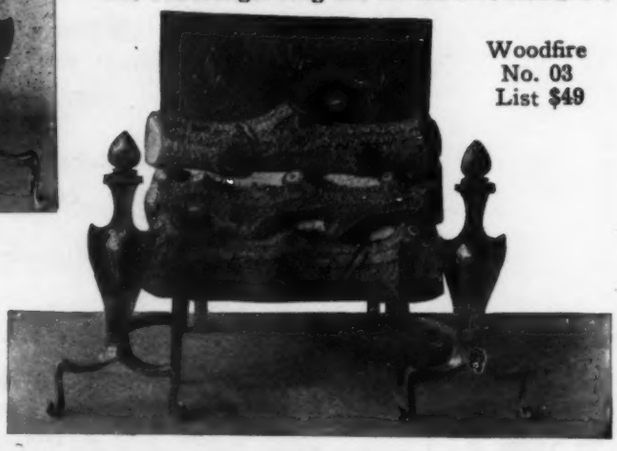
THE HOMESTEAD "WOODFIRE" of natural appearing oak or birch logs gives forth a cherry warmth when lighted and are highly decorative when "cold."

Let us help you to design and erect attractive settings of old or modern types—English, Spanish, New England, etc.—that clinch the pending sale.

Especially when you set them in appropriate surroundings such as that shown above. The "Coalfire" and "Woodfire" are interchangeable and readily accommodate themselves to any environment and decorative scheme.

THE HOMESTEAD "COALFIRE" is a natural reproduction of the English Coal Basket, with its glowing fire of Red Hot Radiance.

Woodfire
No. 03
List $49



HOMESTEAD HEATER COMPANY, Inc.

Selvage Street and Fabyan Place WALTER KENNEDY, PRESIDENT **Newark, N. J., U. S. A.**

PROTECTION for the latest and largest gas line of all.

340 miles of 22" and 20" pipe laid between Amarillo, Tex., and Denver, Col., by the Colorado Interstate Gas Company. (Ford, Bacon & Davis, Inc.,—Engineers)

BITUMASTIC
REG. U.S. PAT. OFF.

ENAMEL

on the Amarillo-Denver Line

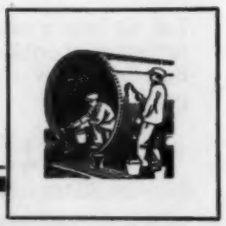
Chosen successively to protect the world's largest gas lines, BITUMASTIC ENAMEL has again been selected—this time for the Amarillo-Denver Line of the Colorado Interstate Gas Company—the latest and the largest gas line of them all.

BITUMASTIC products comprise 87% of the coatings ordered for this line. The selection of these coatings was guided by engineers who have made extensive use of BITUMASTIC ENAMEL on the largest of previous lines. It once more demonstrates the fact that, to insure the permanence of pipe line installations, "there is no possible substitute for experience."

Full details on request.

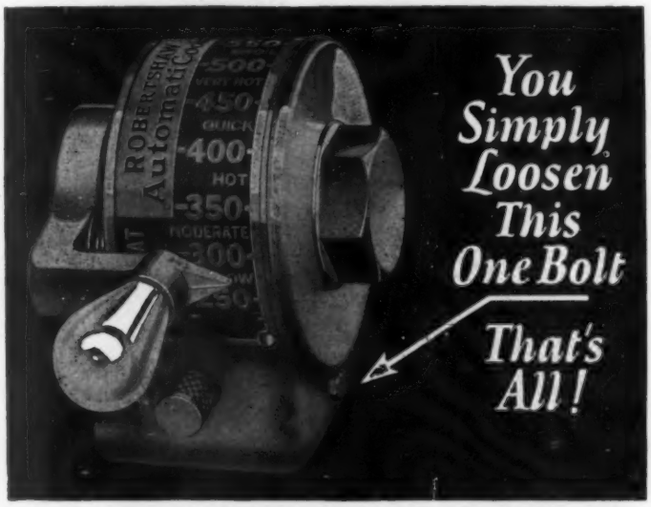
Wailes Dove-Hermiston Corporation
Whitehall Building, New York

Philadelphia Cleveland Chicago Tulsa Houston San Francisco



The "B" Type Puts Confidence in the Gas Range Sale

ROBERTSHAW AutomatiCook



The "B" Type AutomatiCook—Guards the future

The Gas Company or Stove Dealer Can Now Guarantee Permanent Oven Heat Control

No matter what might happen in 10 years—20 years—the "B" Type AutomatiCook insures continuous Thermostat control as long as the range is in service.

Should the "B" Type AutomatiCook become damaged for any reason, necessitating replacement, it can be removed without disconnecting the range or disturbing the linings or the piping. Simply loosen one bolt, replace the thermostat and tighten the bolt.

Takes just forty seconds to do the job!

The "B" Type AutomatiCook on a gas range enables the stove dealer to satisfy any immediate or future complaint with a minimum of expense and service.

—And while all Robertshaw Thermostats are particularly designed to outlive the gas range, this remarkable quick replacement feature will completely eliminate any doubt in your customer's mind concerning the life of the Thermostat.

Write for complete Information

ROBERTSHAW THERMOSTAT COMPANY

YOUNGWOOD, PA.

"Thermostats since 1899"

CONTROL OF TEMPERATURES

In the Efficient Gas Plant, the controlling and recording of critical temperatures has proved an economy. Records of temperatures and pressures are records of plant operation. And such records of operation are guides to efficiency.

The gas from the condenser should be at the correct temperature entering the scrubbers. At this large New York Gas Plant the proper temperature is maintained automatically by an American Temperature Controller, which regulates the amount of water fed to the condenser. American Recording Thermometer produces a written record of the temperature, thus serving as a check on the controller.

Write for the following Catalogs:

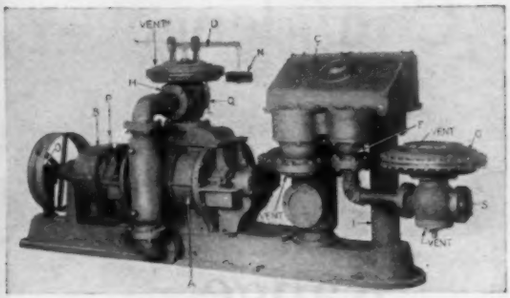
Gas Maker's Gauge Catalog P-7
Recording Gauge Catalog E-7
Thermometer Catalog F-7
Recording Thermometer Catalog H-7
Tachometer Catalog J-7
Temperature Controller Catalog R-7

AMERICAN INSTRUMENTS

American Schaeffer & Budenberg Corporation

338 BERRY ST. BROOKLYN, N. Y.
Branches in Principal Cities
Makers of American Industrial Instruments Since 1851

The Improved Kemp System



THERE is but one KEMP SYSTEM. There is nothing just as good —no other way to get the results which are had from the KEMP SYSTEM.

The big improvement in conditions and maximum benefits which you desire cannot be had by changing to high pressure, some other type of inspirator or a mixing fitting. It costs but little more to utilize with your operations some of the special applications which are common to the KEMP SYSTEM and are productive of the greatest benefits. The KEMP SYSTEM is the best investment.

Write, phone or telegraph today for a representative

THE C. M. KEMP MFG. CO.

Baltimore, Md.

READY!

THE NEW AND FINER
ROPER 900 SERIES

To-day, Roper announces important refinements in the 900 Series of Roper Gas Ranges. Refinements that will bring an even greater public appreciation of Roper beauty. Note, on the range shown here, the absence of hinge boxes and visible door catches. Note, too, the grey enamel base band on this grey and white Roper. Get full details about this sales-winning Roper series. Write or wire.

Roper Colonial Design Color Ranges

BLUE . . RED . . YELLOW . . GREEN

are getting the greatest reception ever accorded a line of gas appliances. Draw the crowds to your store—speed replacement sales—get the newlywed business, by featuring Roper Color Ranges in your window now. Write or wire for the facts.

GEO. D. ROPER CORPORATION
ROCKFORD, ILLINOIS
Pacific Coast Branch: 135 Bluxome Street
San Francisco, Calif.

Roper Standard Gas Ranges are tested and approved by Good Housekeeping Institute and carry the Blue Star Seal of Approval of the American Gas Association Laboratory.

ROPER

TRADE MARK REG. U.S. PAT. OFF. REG. IN CANADA

GAS RANGES
GAS FURNACES

CAST IRON CONSTRUCTION

Legs, front frame, cooking top frame, door frames, end shelf, etc., are of cast iron construction.

BE SURE THE ROPER PURPLE LINE AND THE ROPER COMPLETE OVEN CONTROL ARE ON THE GAS RANGE YOU SELL

IGNISITE

(Reg. U. S. Pat. Off.)

HIGH TEMPERATURE CEMENT

For Refractory Construction and Repairs

IGNISITE meets the most exacting conditions in Gas Plant operation. It is

A real refractory as well as a cement.
Bonds at normal temperatures.
Strictly uniform in quality.
Plastic,—easy to mix and handle.
Used for construction and repairs on coke ovens, Benches, water and oil gas sets, Boiler settings, etc.

IGNISITE has been developed through years of research and practical trial under operating conditions by engineers engaged in refractory construction.
IGNISITE pays for itself by increasing life of firebrick. It will make a perfect surface seal at 1200° to 1400° F. Withstands temperatures up to the point of fire brick failure. When properly used there is no shrinkage.
IGNISITE is sold under an absolute guarantee of replacement or money back if it fails to fulfill our claims.

Shipped in plastic form—ready for use—in air tight drums of 200 to 800 lbs.

The M. W. KELLOGG CO., Inc.

9 DEY STREET - **Refractories Division** - - NEW YORK

BAROMETERS

PHILADELPHIA, THE WORKSHOP OF THE WORLD, has 14,000 Manufacturing Establishments of which many have World-Wide Reputations.

"PRINCO" STANDARD FORTIN MERCURIAL BAROMETERS

are in World-Wide use because they, too, have a "World-Wide Reputation"

THEY ARE GOOD BAROMETERS
THEY ARE REASONABLE IN PRICE!

For more than a decade they have been made in such manner that they can be shipped safely and successfully wherever there is a common carrier. This has been recognized as an achievement in Barometry.

PRECISION THERMOMETER & INSTRUMENT COMPANY

1439 BRANDYWINE STREET - - - - - PHILADELPHIA, PA.

Vit

The New Enamel-Stain Remover

Here is a new and easier way for the housewife to keep her range . . . and all the rest of her enamelware . . . bright and stainless.

Vit is made to remove set stains and discolorations from any porcelain or vitreous surface. It will conquer the most stubborn stain.

Display and sell Vit with your ranges. We will furnish you with an attractive display stand. The coupon underneath will bring you a tryout can of Vit and full information. Get it into the mail today.

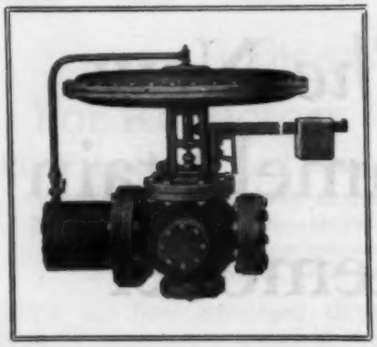
A PRODUCT OF THE A-B STOVE CO. BATTLE CREEK, MICH.

A-B Stove Company
Battle Creek, Mich.

LET'S HAVE A SAMPLE CAN OF VIT, AND YOUR PROPOSITION.

NAME ..... ADDRESS .....

Efficient Regulation



The Fulton
Low Pressure Regulator

Efficient regulation depends upon the accuracy of the regulation equipment. For 35 years the Chaplin-Fulton Manufacturing Company has made regulating devices for the gas industry That the aim to make the most accurate and reliable equipment possible has been reflected in the Chaplin-Fulton series of regulators, is evidenced by their popularity and standing with the foremost gas companies.

For an investment in efficient regulation, the following Chaplin-Fulton Regulators offer you the most that can be built into devices for these purposes

High Pressure Regulators
Low Pressure Regulators
House Regulators
Illuminating or Dead Weight House Regulators
House Service Regulators—Spring Style
High Pressure Spring Regulators
Little Hercules High Pressure Regulators
Gas-Fuel Boiler Governors
Gas Relief Valves
Duplex Sensitive Gas Governors
Back or Check Pressure Regulators

Write for information and catalogues.

The Chaplin-Fulton Mfg. Co.

28-40 Penn Avenue Pittsburgh, Pa.

BRISTOL'S
Recording Thermometers aid in controlling ammonia distillation. . . . . .

Temperatures maintained during ammonia still operation must be closely watched and regulated, in order to recover, as soon as possible, a liquor of maximum concentration, with a minimum consumption of lime and steam. The continuous check-up of temperature conditions, provided on the chart records of Bristol's Recording Thermometer, makes it a simple matter to keep the temperature within the narrow limits that assure maximum recovery.

The Bristol's Thermometer is of simple, rugged construction; incorporating features which make it especially adaptable for Gas Plant use.

Write for complete information

The Bristol Company Waterbury, Connecticut

FOR 35 YEARS — MAKERS OF — BRISTOL'S — RECORDING INSTRUMENTS

BRANCH OFFICES

BOSTON, MASS.
NEW YORK, N. Y.
PHILADELPHIA, PA.
PITTSBURGH, PA.
BIRMINGHAM, ALA.
DETROIT, MICH.
CHICAGO, ILL.
ST. LOUIS, MO.
DENVER, COLO.
SAN FRANCISCO, CAL.

AUSTIN "LITTLE WONDER"

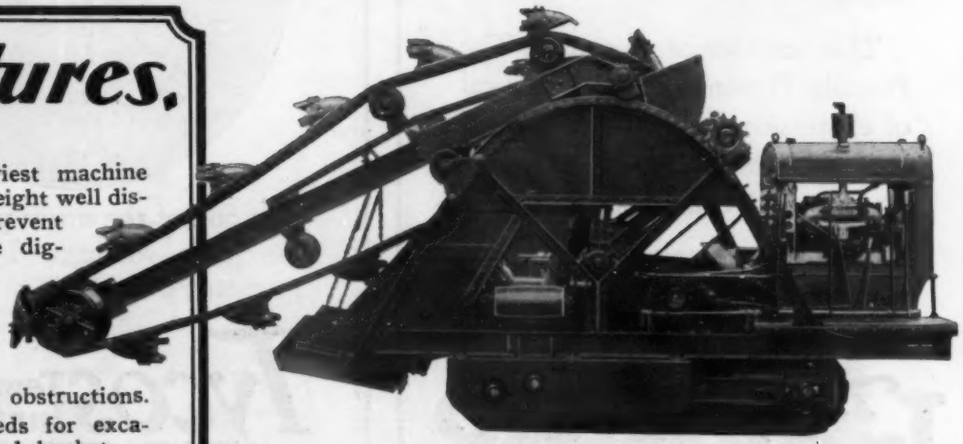
PUBLIC SERVICE DITCHER

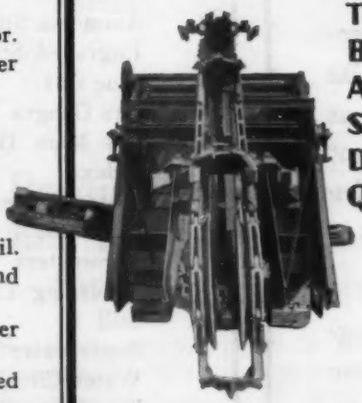
for Digging

SHALLOW SEWERS, LATERALS, PIPE LINES GAS LINES and TELEPHONE CONDUIT

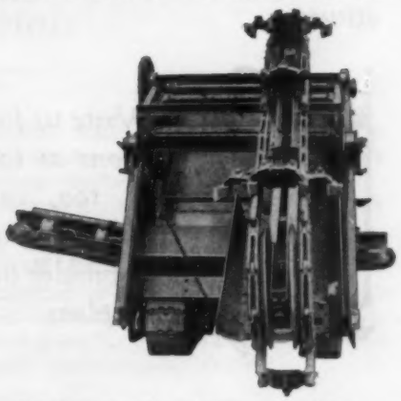
features.

1. Heaviest machine built. Weight well distributed to prevent jumping while digging and hold trench line.
2. Digs 9" from trees, poles or other obstructions.
3. Two speeds for excavator chain and buckets.
4. Two speeds Conveyor Belt.
5. Quick Shift Conveyor.
6. Boom shifts to either side of machine.
7. Positive boom crowd.
8. Only ditcher with a positive spring type bucket cleaner.
9. Only ditcher that will successfully dig sticky soil.
10. Digs 30" wide, 8' and 10' deep.
11. Digs 12" to 100" per minute.
12. Works in confined spaces.
13. Safety factors prevent damage to machinery.
14. One man operated.





THE FASTEST DIGGING DITCHER BUILT. . PATENTED FEATURES ALL STEEL CONSTRUCTION SIMPLE-COMPACT-RUGGED DIGS ANY SOIL FORMATION QUICKLY AND ECONOMICALLY



AUSTIN MACHINERY CORPORATION

MUSKEGON, MICHIGAN

SALES OFFICES

NEW YORK, N. Y., 30 CHURCH ST.
CHICAGO, ILL., 1355 RAILWAY EXCHANGE BLDG.
ST. LOUIS, MO., 1500 N. BROADWAY
CLEVELAND, O., 2112 SUPERIOR VIADUCT
SALT LAKE CITY, 311 NESS BLDG.
DALLAS, TEX., 209½ N. CLINTON ST.
DETROIT, MICH., 7436 FOURTEENTH ST.
TORONTO, CAN., 17 WALLER ST.
LOS ANGELES, CAL., 1947 MATEO ST.

"THE HOME INCINERATOR is an excellent device. The sanitation and tidiness of the home are more complete daily due to its use. The helpfulness and cleanliness derived from its service more than offset the cost of operation. It is built for utmost service and desirability."

This testimonial of a user, The Priscilla Proving Plant, is typical of expressions from the other well pleased users of the Home Incinerator—now over 6,000 of them.

You sell complete satisfaction with the service as well as a 15,000 cu. ft. annual gas load when you sell

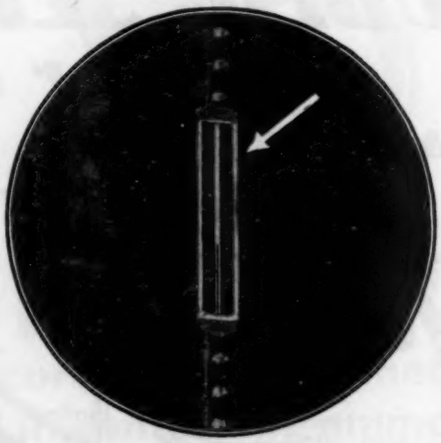
The Home IncineratoR

Tested, approved and recommended by every recognized Gas Company Testing Laboratory, as well as the Priscilla Proving Plant and the Good Housekeeping Institute.

Write us for suggestions as to how you, too, can include this good load-builder in your sales plans.

HOME INCINERATOR CO.
MILWAUKEE, WIS.

Water Condenser Inlet



Just one of the many places in the gas plant where a Tycos Thermometer proves its worth.

Tycos Temperature Instruments
INDICATING-RECORDING-CONTROLLING

FOR EVERY GAS PLANT NEED

Ammonia Still Thermometer
Engraved Stem "
Flue Gas "
Gas Gauges
Gas Main Thermometers
Index "
Meter Prover "
Engraved "
Pyrometers
Recording Thermometers
Still "
Superheater "
Water Circulation "
Regulators for Pressures and Temperatures

Gas Plant Catalog upon request.

Taylor Instrument Companies
Rochester, N. Y., U. S. A.

Canadian Plant Tycos Building Toronto
Manufacturing Distributors in Great Britain Short & Mason, Ltd., London

There's a Tycos or a Taylor Temperature Instrument for Every Purpose

THE BABY DIGGER

REGISTERED

Down Go Costs

Up Goes Production

Because the Baby Digger has these four essentials for Gas Trenching—

1. COMPACT DESIGN.—Really compact—less than an ordinary sidewalk in width—more "hand-jobs" become "machine-jobs" with a BABY DIGGER.

2. MOBILITY. — Four tons weight — mounted on full crawler traction—makes it exceedingly nimble—quickly and easily transported from job to job on trailer or truck.

3. DIGGING ABILITY. — Abundant reserve power—husky construction—wheel-type digging action—built-in features which explain its ability to maintain a high daily trench footage in all types of soil.

4. ECONOMICAL OPERATION. — The most striking feature of BABY DIGGER performance—a fraction of your annual hand-trenching cost pays for a BABY DIGGER and does the work incomparably faster.

Get the Benefit of Real Trenching Efficiency in 1928!

THE CLEVELAND TRENCHER COMPANY

20100 ST. CLAIR AVE. Pioneers of the Small Trencher CLEVELAND, OHIO

COOPER OVEN THERMOMETER

FEATURES OF NEW STYLES A and B

STYLE B

(*Actual Size*)

Interchangeable with heat control.

Nickel or Porcelain Enamel Cover

- Shows actual Fahrenheit degrees.
- Quick-acting thermostatic metal registers correct temperature immediately.
- Extreme heat cannot injure or make the thermometer inaccurate.
- Style B interchangeable with heat controls.
- Carefully calibrated.
- Porcelain enamel dials in two colors.
- Accuracy guaranteed for the life of the oven.
- No glass or mica to get broken.
- Economical in price.
- Handsome in appearance, adds greatly to the looks of any oven.

The Cooper Oven Thermometer Co.

4 MAIN STREET (Established 1885) PEQUABUCK, CONN.

Repair in the Modern Way

Retorts, Jamb Joints, Furnace Walls, Arches and Baffles Should Be Repaired With the

QUIGLEY GUN

The Quigley Refractory Gun fills cracks, repairs retorts, jamb joints of coke ovens, furnace walls, arches, baffles, etc. It shoots the plastic mixture with great velocity so that it sticks, where hand troweled or rammed-in applications might fail to hold. The Quigley Gun also makes hot patches.

Shooting Hytempite into Jamb Joint with the Quigley Refractory Gun.

HYTEMPITE

(Reg. U. S. Pat. Off.)

HYTEMPITE is used by hundreds of Gas Companies for laying up firebrick, (and when mixed with crushed old firebrick or Ganisand) for patching and repairing refractory linings, making special shapes and tile, etc.

The mixture of Hytempite and crushed old firebrick applied to wall or joint with the Quigley Gun makes certain an everlasting gas tight surface.

Keep a drum of Hytempite in the retort house or Boiler Room for quick repairs

QUIGLEY FURNACE SPECIALTIES CO., Inc.

26 CORTLANDT STREET NEW YORK

Quick Service from Stock in Every Industrial Center

Eliminate Welded Pipe
in Gas, Oil and Steam Lines

SEAMLESS STEEL PIPE is supplanting welded pipe for practically every purpose on account of its permanence, safety and reliability.

Pittsburgh Seamless Steel Pipe is made in all sizes up to 13⅜ inches O. D., can be furnished in various ranges of carbon or with copper content, and with ends beveled for welding joints or plain for use with patent couplings. In sizes 6 inches and over it is available in *long lengths up to about 40 or 45 feet,* reducing to a minimum the number of joints and effecting a large saving in laying the line.

"Pittsburgh Seamless" tubing and pipe is made by piercing solid billets of basic open hearth steel—a severe process that conditions the steel, giving it a fine texture and uniform strength. It is made by the largest manufacturers of seamless steel tubular products exclusively. "Seamless" is the modern material for all important piping. Write for information applying to your specific needs.

Pittsburgh Steel Products Co.
DIVISION OF
Pittsburgh Steel Co.

PITTSBURGH NEW YORK DETROIT
CHICAGO HOUSTON TULSA

Pittsburgh Seamless Steel Pipe and Tubing may be used to advantage for—

Gas, Oil and Steam Lines
Casing Drill Pipe
Oil Well Tubing
Still Tubes Heating Systems
Refrigerating Apparatus
and all
High Pressure Piping
Stocks at Convenient Points

Pittsburgh Seamless

Seamless Steel Tubes are rapidly becoming the standard for all important piping.

Why not adopt them now and benefit by their greater safety and economy?

WESTMORELAND "CRITERION" GAS COAL

The Standard for Gas Making Since 1854

Since this Company commenced operations, its well-known Westmoreland "Criterion" Gas Coal has been largely used by the Gas Companies of Northeastern United States and Canada, and its character is established as having no superior in gas giving qualities and freedom from sulphur and other impurities.

Mines situated on the Pennsylvania Railroad,
in Westmoreland County, Pa.

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Principal Office, Lewis Building, 15th and Locust Sts., Philadelphia, Pa.

Shipping Ports: Philadelphia, Baltimore, South Amboy, N. J., Lake Ports.

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Made of LAVA

There are many forms of Lava outlets available for use with manufactured or natural gas.

Parts which we have made have, through wide commercial use, proven the superiority of Lava over other materials as a seat for gas combustion.

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American Lava Corporation

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Manufacturers of Lava Tips & Heat Resistant Insulators

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DEPENDABLE GAS MAIN BAGS
Type A—Seamless
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GOODMAN CYLINDRICAL STOPPER
Inflatable for higher pressures

SOAP TAPE
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523 Atlantic Ave., Brooklyn, N. Y.

LAVINO OXIDE

FOR GAS PURIFICATION

E. J. LAVINO AND COMPANY. BULLITT BLDG. PHILADELPHIA, PA.

McWANE PIPE

What Does Sand Core Mean To McWane Pipe?

SAND is useful for other things than slippery car rails, chicken gizzards and unstable house foundations. Sand is vital to the quality of McWane Cast Iron Pipe.

The refractory qualities of the sand core in a McWane mold insures a true gray iron structure in the pipe wall on the inside the same as the outside. There is no oxidation during casting on account of air inside the hot pipe. McWane Pipe is the only modern, improved type of cast iron pipe embodying revised weights, thus molded in sand—*inside and outside.*

In McWane Pipe you are sure of the long life of old type pipe combined with the strength and uniformity of the new. Remember, the familiar long-life record of cast iron pipe has been made by pipe "molded horizontally in sand — inside and outside"!

The resistance of cast iron pipe to corrosion in the past is generally believed to be due to the granular structure of the gray iron. This is maintained in the McWane process, thus retaining *all* the virtues which have made for longevity of cast iron pipe through the past centuries.

McWane precalked joints are a privilege—not a necessity. For the man "who pours his own", we make the same sturdy bell-and-spigot pipe minus the joint materials (open bell). Either way, you get the same McWane pipe—brute strength without brute weight, standard lengths and a lower joint cost.

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SALES OFFICES IN PRINCIPAL CITIES

McWANE
CAST IRON PIPE

Lix Material Never varies. It has been of a uniform high quality for more than 25 years.

THE ALPHA-LUX COMPANY, Inc.
192 FRONT ST., NEW YORK CITY
Shipping points convenient to all parts of the country

For long time contact, low temperature or any severe purifying service. **Lix-Sponge** THE PERFECT READY MIXED OXIDE

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for Artificial or Natural Gas.

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High Pressure Service	District Station
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Low Pressure Service	
High Pressure Line	Intermediate Pressure

Relief Valves Back Pressure Valves
Automatic Quick Closing Anti-Vacuum Valves
We Solicit Your Inquiries
GROBLE GAS REGULATOR COMPANY
Anderson, Indiana

Byllesby Engineering and Management Corporation

BYLLESBY PIONEERS IN PUBLIC SERVICE ENGINEERING FINANCE MANAGEMENT

CHICAGO NEW YORK
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Stawite FLOOR SAVERS
UNDER THE FEET OF GAS STOVES, GAS WATER HEATERS and GAS REFRIGERATORS

They protect floor coverings and hardwood floors against the damage caused by the weight concentrated on small iron feet. Made of White Porcelain. —low in price and attractive in appearance.

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Low Pressures $3.50 each

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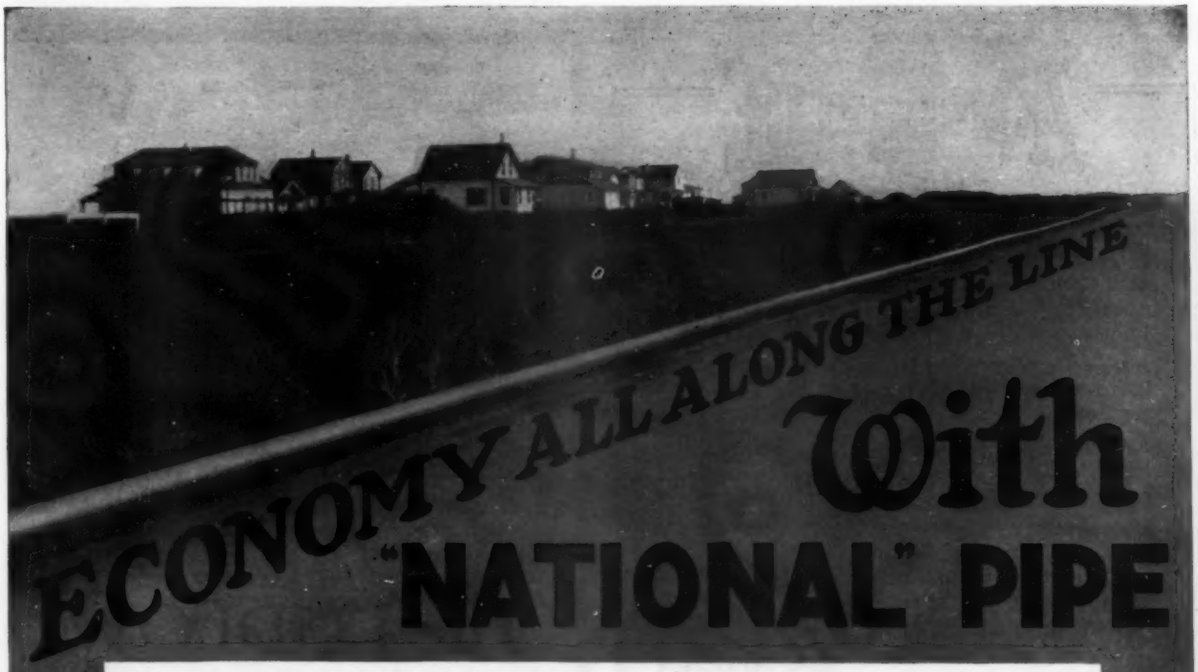
Coal Carbonization Plants, Benches, Repairs, Improvements, Extensions, Apparatus



ECONOMY ALL ALONG THE LINE With "NATIONAL" PIPE

EASY to handle, adaptable for welding, ductile for trenching, strength for reliability, resistant to corrosion, and double lengths for saving time, materials and labor in joint making—these are some of the factors taken into consideration by a New Jersey power and light company in the laying of this 6-inch "NATIONAL" Pipe line along the Atlantic coast. For "NATIONAL" Pipe has proved, by such typical examples as this, that the advantages which it includes, spell economy all along the line.

"NATIONAL" Pipe is made by the largest manufacturer of wrought pipe in the world, by skilled workmen and modern mechanical methods, and, in addition, passes through a system of inspection and tests that assures the utmost economy and reliability in service. Gas companies contemplating the laying of long lines will do well to investigate the advantages of "NATIONAL" Pipe when considering the problems of service and economy. Our engineers will be glad to furnish further information and to cooperate with those interested. Ask for Bulletin No. 26.

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Highly recommended by Gas—Chemical—and Combustion Engineers for Gas Ranges, because it is the only safe and efficient flue to use.

Range Experts consider it a necessity for the more economical—safer—and better operation of gas ranges.

Keeps the Kitchen free of grease and the dirt it collects—Assures the proper oven draft being constant.

Prevents serious hazards caused by connecting Ranges to the outside or oven vents being open.

Silvergray Finish—Aluminum White Porcelain—Black Japan

WORTH MANY TIMES THEIR COST

Patented—Beware of Unsafe, Infringing Imitations

FLANGE END

VALVES

We can furnish Valves for working pressures up to 1200 lbs. per sq. in.

Send for Circular 5

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All sizes up to 3,400 cu. ft. capacity

Meters
Diaphragms
Repairs
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Pumps
Calorimeters
Wet Meters
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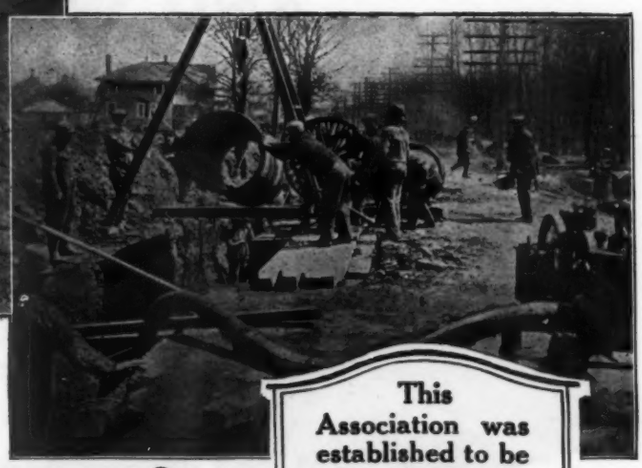
BUSH TERM. BLDG. 4, BROOKLYN, N. Y.

1



2

1- a length of cast iron pipe laid 40 years ago

2- the same pipe, after cleaning, being re-laid GOOD as NEW

The permanence of Bell and Spigot Cast Iron Pipe and the fact that it can be taken up and used elsewhere without loss of efficiency or deterioration, is of vital interest to every taxpayer.

THE CAST IRON PIPE RESEARCH ASSOCIATION
People's Gas Building, Chicago, Ill.

This Association was established to be of service to you

Information regarding the various accepted methods of handling alterations and moving of gas or water mains will be gladly forwarded to you.

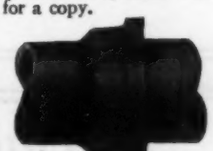
Its functions are:

1. Collecting and compiling data with reference to Cast Iron Pipe and fittings for all purposes.
2. Assisting engineers in solving difficult and unusual problems.
3. Educating the public by national advertising in the importance of having up-to-date waterworks.

—It has nothing to sell:

Engineers, municipal authorities, and contractors are invited to write for special literature on the subject of water systems.

Of special importance is a reprint of an article on the "two mains system." Send for a copy.

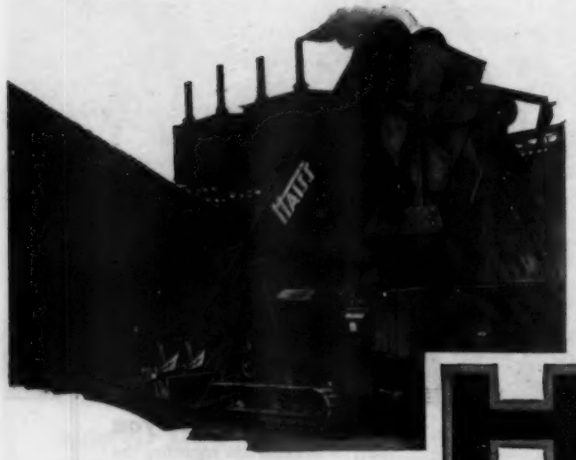


BELL *and* SPIGOT JOINT—
the accepted standard for underground construction.

CAST IRON PIPE

—in continuous service for over 250 years

GET THE LOADER THAT WILL DIG AND WILL SCREEN COKE



Look at the big, powerful Self-Feeding Propellers on this Haiss Loader and the Vibrating Screen Discharge Chute—these are the two salient devices that cut the time and cost of loading coke.

And never forget this—the Vibrating Screen of a HAISS LOADER has proven in service its ability to keep up to the pace of 2 yards-a-minute continuous loading. Let us tell you where this equipment is working.

Ask for Catalog 527 and mention your interest in SCREENING.

The George Haiss Manufacturing Co., Inc.
Park Ave. & 141st St., New York.

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ISBELL-PORTER COMPANY

Engineers and Contractors for Complete Gas Works

I-P C

Manufacturers of All Kinds of Gas Apparatus

NEWARK - NEW JERSEY

Specialists in Fire Clay Refractories
With Over 30 Years Experience

Fire Brick for oil fuel furnaces, boilers and metallurgical furnaces.
Tiles and blocks of special shape for all purposes.
Muffles and planches, Coal gas benches.
Brass furnace linings, Water gas linings, Cupola linings.
Clay and Silica Retorts and settings.
Ground fire clay, Ground fire brick, Plastic fire brick, Refractory Cements.

THE JERSEY CITY REFRACTORIES CO.

135 WEST SIDE AVENUE *A. E. ACHESON* JERSEY CITY, N. J.

all down the line

MONO-CAST pipe *saves money*

FROM the first joint to the last, you save money laying Mono-cast centrifugal cast iron pipe.

You save two ways: first, because Mono-cast pipe costs 10 to 15 per cent less per foot; second, because Mono-cast pipe—*in sixteen foot lengths*—eliminates one-fourth of construction costs:

(a) You save in joint material because with sixteen-foot lengths there are 25 per cent fewer bells.

(b) You save on labor for making joints, digging bell-holes, packing, melting lead, caulking, because there are 25 per cent fewer joints.

(c) Your pipe crew, consisting of the same number of men, will lay the same number of pieces a day—therefore, with Mono-cast pipe in sixteen foot lengths, they will lay greater footage in the line.

More than 2,500,000 feet of Mono-cast pipe are now in service. The engineers who laid this tremendous footage testify *that Mono-cast centrifugal cast iron pipe saves money all down the line.*

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SEATTLE
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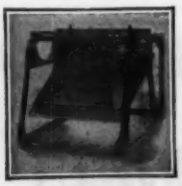
NEW YORK CITY

AMERICAN CAST IRON PIPE COMPANY
BIRMINGHAM, ALABAMA
DISTRICT OFFICES IN PRINCIPAL CITIES

all down the line



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Especially adaptable to the screening of coal and coke. In the re-screening of coke, the terrific vibrations, occurring 3,600 times a minute, remove all breeze at the lowest cost per ton. It requires minimum floor space and head room. It is self-contained, dust and water proof. Requires less than ¾ H. P. per standard screen.

WE DESIGN AND BUILD:

Industrial Railways, Automatic Railways, Cable Railways, Cars, Tracks, Switches, Motor Cars, Scales, Conveyors, Skip Hoists, Electric Vibrating Screens, Cut-off Valves, or Gates, Weighing and Measuring Devices, Coal Crackers, "Stevedore" Transmission Rope, and the "Flotograv" (Coke Reclamation System).

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Improved

IRON BORING OXIDE

ENDURANCE — ACTIVITY
REVIVABILITY

The worth of our material is based not on personal opinions and laboratory tests, but on actual performances at plants.

Let Us Help Solve Your Purifying Problems

GAS — PURIFYING MATERIALS CO. INC.

IRON BORING OXIDE

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LONG ISLAND CITY
NEW YORK
BRANCH YARD
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COX'S COMPUTER

FOR HIGH-PRESSURE FLUID DISCHARGE

Will save hours of tedious, brain-tiring computation and get results instantly when seeking to find the Discharge from a pipe. Also to find suitable initial and Therminal Pressures.

Based on a well-known and reliable formula, which is applicable to Gas, Air and other elastic fluids, flowing through pipes with high initial pressures.

Price $5.00 each, net, in cloth case 6½ x 8 inches

COX'S GAS FLOW COMPUTER

For Low Pressures

This computer solves Prof. Pole's formula for the flow of gas in pipes. All the work is done for the Engineer in making computation relative to the subject covered by the title.

Price $2.50 each, net, in cloth case 6½ x 8 inches.

For Sale by

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Rate at $5.00 per inch for first insertion. $4.00 per inch for each additional insertion of same copy. Positions wanted—$2.00 per issue.

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Young man (27) desires position with company where there is opportunity for the future. Have had 5½ years experience in Utility business, including office management, commercial manager and lastly New Business Manager. Am at present employed. Address Box 926, care American Gas Journal, 53 Park Place, New York City.

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Boy Does The Work of Two Men
Locks Either Upright or for Draining
Pays for Itself by Drainage Saved.
Prevents Personal Damage - Hence Lawsuits
Endorsed by Safety Bureaus and Institutes.

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CONSULTING ENGINEER
POWERS THEATRE BUILDING
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GAS ENGINEERING CO.
Manufacturers of Gas Production Equipment
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Specialist in Ammonia Recovery
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Manufacturers of GOVERNORS, APPARATUS and EQUIPMENT
IRON Connelly Iron Sponge and Governor Co. SPONGE
New York, Chicago U.S.A.
USE THE BENEFIT OF 50 YEARS EXPERIENCE!

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Am. Schaeffer & Budenberg Corp.
Bartlett-Hayward Co.
The Gas Machinery Co.
Robertshaw Thermostat Co.
Semet Solvay Engineering Corp.
Smoot Engineering Corp.
The U. G. I. Contracting Co.
Taylor Instrument Cos.
Western Gas Construction Co.
Hot Water Heat System
Mueller Co.

CONVEYORS
Geo. Haiss Mfg. Co.
C. W. Hunt Co., Inc.
Isbell-Porter Co.
The Koppers Construction Co.
Semet Solvay Engineering Corp.

CONCENTRATORS AMMONIA
Bartlett-Hayward Co.
The Gas Machinery Co.
Isbell-Porter Co.
Semet Solvay Engineering Corp.

COOLERS
Semet-Solvay Engineering Corp.
Western Gas Construction Co.

COOLING COILS
Semet-Solvay Engineering Corpn.

COUPLINGS
Bartlett-Hayward Co.
S. R. Dresser Manufacturing Co.
National Tube Co.
P. H. & F. M. Roots Co.

CRUSHERS
C. W. Hunt Co., Inc.

DE-EMULSIFIERS
Semet-Solvay Engineering Corpn.

DERRICK—PIPE
Safety Gas Main Stopper Co.

DISCHARGING MACHINERY
Bartlett-Hayward Co.
Russell Engineering Co.

DOMESTIC INCINERATORS
Home Incinerator Co.
Kernit Incinerator Co.

DRAFT GAUGES
Am. Schaeffer & Budenberg Corp.
Bristol Co., The
Precision Ther. & Inst. Co.

DRILLING MACHINES
Mueller Co.

DRYERS (Clothes)
Lamneck Co., The W. E.

ELECTRIC LOCOMOTIVES
C. W. Hunt Co., Inc.

ELEVATORS
Craig Ridgway & Son Co.

ENGINE INDICATORS
Am. Schaeffer & Budenberg Corp.

ENGINEERS
Combustion
Bartlett-Hayward Co.
The Improved Equipment Co.
The Koppers Construction Co.
Russell Engineering Co.
Smoot Engineering Corp.
Consulting
Bartlett-Hayward Co.
The Koppers Construction Co.
Russell Engineering Co.
Semet Solvay Engineering Corp.
The U. G. I. Contracting Co.
George H. Waring
Contracting
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
Isbell-Porter Co.
The Improved Equipment Co.
The Koppers Construction Co.
Russell Engineering Co.
Semet Solvay Engineering Corp.
The Stacey Bros. Gas Constr. Co.
The Stacey Mfg. Co.
The U. G. I. Contracting Co.
West Gas Improvement Co.
Designing
Western Gas Construction Co.

EXHAUSTERS
The Connersville Blower Co.
The Gas Machinery Co.
Isbell-Porter Co.
P. H. & F. M. Roots Co.
The Stacey Mfg. Co.
The U. G. I. Contracting Co.

EXPANSION BENDS
Mueller Co.

FILES (Steel and Wood)
Remington Rand Business Service, Inc.

FIREBRICK—CHECKER BRICK
Botfield Refractories Co.
The Jersey City Refractories Co., Inc.
Russell Engineering Co.
Semet Solvay Engineering Co.
The U. G. I. Contracting Co.
Western Gas Construction Co.

FIREBRICK, CEMENT
Botfield Refractories Co.
Quigley Furnace Spec. Co., Inc.

FITTINGS
Isbell-Porter Co.
The Gas Machinery Co.
Mueller Co.
Semet Solvay Engineering Corp.
The Stacey Mfg. Co.
U. S. Cast Iron Pipe & Fdy. Co.
Western Gas Construction Co.

FITTINGS, FLANGED
U. S. Cast Iron Pipe & Fdy. Co.

FITTINGS
Pipe
American Cast Iron Pipe Co.
Semet-Solvay Engineering Corp.

FIXTURES
General Gas Light Co.
Welsbach Co.

FLOORS, IRON, BRICK AND STEEL
Western Gas Construction Co

FLUE PIPE (Cast Iron Oval)
James B. Clow & Sons

FLUES (Consuming) for Gas Range
Akme Flue, Inc.

FURNACES
Gas Fired
Monarch Engineering Co.
Warm Air
Geo. D. Roper Co.

BUILT FOR SERVICE

30 YEARS EXPERIENCE

(USE Lock Wing Iron Body Brass Key Gas Cocks)

KITSON

SUBSTANTIAL

PRICE CONSISTENT WITH QUALITY
LET US KNOW YOUR NEEDS

Kitson Company

PHILADELPHIA, PA.

ESTABLISHED 1897

Buyers' Reference Index

See page 123 for advertisements of these products

GAS ANALYSIS APPARATUS
American Meter Co.
S. R. Dresser Manufacturing Co.
Metric Metal Works
Precision Ther. & Inst. Co.
The U. G. I. Contracting Co.

GASKETS
Southwestern Pipe Joint & Engineering Co.
Safety Gas Main Stopper Co.

GAS MASKS
Safety Gas Main Stopper Co.

GAS PLANTS, COMPLETE
Bartlett-Hayward Co.
Carl Still, Incorporated.
The Gas Machinery Co.
Gas Engineering Co.
The Improved Equipment Co.
Isbell-Porter Co.
Russell Engineering Co.
Semet Solvay Engineering Corp.
The Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
The U. G. I. Contracting Co.
Western Gas Construction Co.
West Gas Improvement Co.

GAS TESTING APPARATUS
Alpha-Lux Company, Inc.
Lambert Meter Co.
Metric Metal Works
Pittsburgh Equitable Meter Co.
Precision Ther. & Inst. Co.
Superior Meter Co.
The U. G. I. Contracting Co.

GAUGE BOARDS
Am. Schaeffer & Budenberg Corp.
Western Gas Construction Co.

GAUGES
Am. Schaeffer & Budenberg Corp.
American Meter Co.
The Bristol Co.
Connelly Iron Sponge & Gov. Co.
Helme & McIlhenny
Lambert Meter Co.
Maryland Meter Works
Metric Metal Works
Safety Gas Main Stopper Co.
Taylor Instrument Companies
Pressure-Recording
American Schaeffer & Budenberg Co
D. McDonald & Co.
Superior Meter Co.

GLOVES
Rubber
Leather
Safety Gas Main Stopper Co.

GOVERNORS
The Stacey Mfg. Co.
Automatic
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Gov. Co.
Pittsburgh Equitable Meter Co.
Coke Oven
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Gov. Co.
The Gas Machinery Co.
The Koppers Construction Co.
Pittsburgh Equitable Meter Co.
Semet Solvay Engineering Corp
Smoot Engineering Corp.
District
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Gov Co.
Groble Gas Regulator Co.
Helme & McIlhenny
Isbell-Porter Co.
Pittsburgh Equitable Meter Co.
Reynolds Gas Regulator Co.
Semet Solvay Engineering Corp.
Smoot Engineering Corp.
Exhauster
Chaplin-Fulton Mfg Co.
Connelly Iron Sponge & Gov. Co.
The Connersville Blower Co.
Isbell-Porter Co.
Pittsburgh Equitable Meter Co
Smoot Engineering Corp.
High Pressure
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Gov. Co.
Pittsburgh Equitable Meter Co.
Reynolds Gas Regulator Co.
P. H. & F. M. Roots Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Laboratory
D. McDonald & Co.
Low Pressure
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Gov. Co.
Pittsburgh Equitable Meter Co.
Reynolds Gas Regulator Co.
P. H. & F. M. Roots Co.
Semet Solvay Engineering Corp.
Smoot Engineering Corp.
The Sprague Meter Co.
Retort House
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Gov. Co.
The Gas Machinery Co.
Isbell-Porter Co.
Pittsburgh Equitable Meter Co.
Russell Engineering Co.
Semet Solvay Engineering Corp.
Smoot Engineering Corp.
Service
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Gov. Co.
Mueller Co.
Pittsburgh Equitable Meter Co.
Reynolds Gas Regulator Co.
Station
The Sprague Meter Co.
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Gov. Co.
Helme & McIlhenny
Pittsburgh Equitable Meter Co.
Reynolds Gas Regulator Co.
Semet Solvay Engineering Corp.
Station Automatic
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Gov Co.
Pittsburgh Equitable Meter Co.

GRAVITOMETERS
Precision Thermometer & Instrument, Co.
Taylor Instrument Cos.

HEATERS
Room
James B. Clow & Sons
General Gas Light Co.
Homestead Heater.
Welsbach Company

HEATERS (WATER)
Hot Water
Electric Porcelain & Mfg. Co.
Humphrey Co.
Kompak Company
Welsbach Co.
House
American Gas Products Corp.

HOISTS
C. W. Hunt Co., Inc.
Geo. Haiss Mfg. Co., Inc.

HOLDERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
The Koppers Construction Co.
Riter-Conley Co.
The Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
Western Gas Construction Co.

HOPPERS—COAL AND COKE
Bartlett-Hayward Co.
Cruse-Kemper Co.
Riter-Conley Co.
Russell Engineering Co.
Semet Solvay Engineering Corp.
The Stacey Mfg. Co.

HOTELS
Shelburne Hotel.

HYDROGEN GAS APPARATUS
Bartlett-Hayward Co.
Gas Engineering Co.
The Improved Equipment Co.
Semet Solvay Engineering Corp.
The Stacey Mfg. Co.

HYDROMETERS
Precision Ther. & Inst. Co.
Taylor Instrument Companies

INCINERATORS—GAS FIRED
Home Incinerator Co.
Kernit Incinerator Co.

INDUSTRIAL GAS MIXERS
Geo. D. Roper Corp.

INDUSTRIAL TRACK
C. W. Hunt Co., Inc.

INSTRUMENTS
Am. Schaeffer & Budenberg Corp.
The Bristol Co.
Metric Metal Works
Precision Ther. & Inst. Co.
P. H. & F. M. Roots Co.
Taylor Instrument Cos.
The U. G. I. Contracting Co.
Recording
Am. Schaeffer & Budenberg Corp.
Alpha-Lux Company, Inc.
Superior Meter Co.

JOINTS (Pipe)
Southwest Pipe Joint & Eng. Co.
Semet-Solvay Engineering Corp.
U. S. Cast Iron Pipe & Foundry Co.
Insulating
Semet-Solvay Engineering Corp.
The U. G. I. Contracting Co.

JOINT RUNNERS
Safety Gas Main Stopper Co.

LAMPS
General Gas Light Co.
Kitson Co.
Welsbach Co.

LAMP POSTS
General Gas Light Co.
Kitson Co.
Welsbach Street Lighting Co. of America

LOADERS—BUCKET, PORTABLE
Geo. Haiss Mfg. Co.

LOOSE LEAF EQUIPMENT
Remington Rand Business Service, Inc.

MANILA & WIRE ROPE
C. W. Hunt Co., Inc.

MANTLES
General Gas Light Co.
Welsbach Co.

MASKS—GAS
Melters
Connelly Iron Sponge & Gov. Co.
The Safety Gas Main Stopper Co

MAST & GAFF OUTFITS
Geo. Haiss Mfg. Co.
C. W. Hunt Co., Inc.

MEASURING CHUTES
C. W. Hunt Co., Inc.

METERS
Air
American Meter Co.
The Connersville Blower Co.
John J. Griffin & Co.
Lambert Meter Co.
D. McDonald & Co.
Metric Metal Works
Neptune Meter Co.
Pittsburgh Equitable Meter Co.
P. H. & F. M. Roots Co.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works
The U. G. I. Contracting Co.
Artificial
American Meter Co.
John J. Griffin & Co.
Helme & McIlhenny
Lambert Meter Co.
Maryland Meter Works
D. McDonald & Co.
Metric Metal Works
Neptune Meter Co.
Pittsburgh Equitable Meter Co.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works
Demand
D. McDonald & Co.
Dry
American Meter Co.
Lambert Meter Co.
Maryland Meter Works
D. McDonald & Co.
Metric Metal Works
Pittsburgh Equitable Meter Co.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works
Natural Gas
American Meter Co.
The Connersville Blower Co.
John J. Griffin & Co.
Helme & McIlhenny
Lambert Meter Co.
Maryland Meter Works
D. McDonald & Co.
Metric Metal Works
P. H. & F. M. Roots Co.
Pittsburgh Equitable Meter Co.
The Sprague Meter Co.
Superior Meter Co.
Oil
Western Gas Construction Co.
Prepayment
American Meter Co.
John J. Griffin & Co.
Lambert Meter Co.
Maryland Meter Works
D. McDonald & Co.
Metric Metal Works
Pittsburgh Equitable Meter Co.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works
Station
American Meter Co.
The Connersville Blower Co.
The Gas Machinery Co.
John J. Griffin & Co.
Lambert Meter Co.
Maryland Meter Works
D. McDonald & Co.
Metric Metal Works
Pittsburgh Equitable Meter Co.
P. H. & F. M. Roots Co.
Superior Meter Co.
Nathaniel Tufts Meter Works
Steam
The U. G. I. Contracting Co.
Test
American Meter Co.
John J. Griffin & Co.
Lambert Meter Co.
Maryland Meter Works
D. McDonald & Co.
Metric Metal Works
Pittsburgh Equitable Meter Co.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works

METER CONNECTIONS
American Meter Co.
Bartlett-Hayward Co.
S. R. Dresser Manufacturing Co.
D. McDonald & Co.
Maryland Meter Works
Mueller Co.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works

MIXERS, GAS
The C. M. Kemp Mfg. Co.
Geo. D. Roper Corp.
Smoot Engineering Corp.

MOTOR CARS
C. W. Hunt Co., Inc.

NAPHTHALENE EXTRACTORS
Semet-Solvay Engineering Corp.
Western Gas Consruction Co.

ORE, CHROME
Botfield Refractories Co.
Lavino, E. J. & Co.

OVENS COKE AND GAS
Carl Still, Incorporated.
The Gas Machinery Co.
The Improved Equipment Co.
The Koppers Construction Co.
Russell Engineering Co.
Semet Solvay Engineering Corp.
The U. G. I. Contracting Co.

OXIDE
Alpha-Lux Company, Inc.
Connelly Iron Sponge & Gov. Co.
Gas Purifying Materials Co., Inc
E. J. Lavino & Co.

PACKING
Asbestos
Jute
The Safety Gas Main Stopper Co.

PAINTS
Jos. Dixon Crucible Co.
The U. G. I. Contracting Co.
Wailes Dove-Hermiston Corp.

PAINTS, ANTI ACID AND ALKALI
Quigley Furnace Spec. Co., Inc.

PAINTS
Graphite
Jos. Dixon Crucible Co.

PAINTS, RUSTPROOF
Quigley Furnace Spec. Co., Inc.

PHOTOMETERS (JET)
Connelly Iron Sponge & Gov. Co.

PHOTOMETERS
Lambert Meter Co.
The U. G. I. Contracting Co.
Warren Foundry & Pipe Co.

PIPE
Bartlett-Hayward Co.
Cast Iron Pipe Publicity Bureau
National Tube Co.
Semet Solvay Engineering Corp.
The Stacey Mfg. Co.
U. S. Cast Iron Pipe & Fdy. Co.
Western Gas Construction Co.

IMPORTANCE OF PROPER APPLICATION

A large percentage of so-called failures of protective paints is due to improper application

Improper application may be due to the fact that many paints are difficult to apply. This difficulty is usually because the paint drags under the brush, resulting in great unevenness in the thickness of the coating. Or, it may be due to the heavy specific gravity of the pigment that causes sagging. In order to avoid this latter fault, the paint is brushed out so far as to make the coat exceedingly thin.

Even with expert workmen, these defects are decidedly a contributing cause of paint failures.

Neither of these objections is present in Dixon's Silica - Graphite Paints. Anyone using them for the first time wonders at the ease and certainty with which they are applied. The surfaces are easily and quickly covered, and, because of the low specific gravity of the pigment, there is no sagging.

This ease of spreading is a direct result of the lubricating quality of the flake graphite pigment, and is also the explanation of the large volume of pigment which may be incorporated in Dixon's Paints.

Before painting, all surfaces should be thoroughly cleaned and free from scale, dirt, blistered paint and moisture. The method of accomplishing is optional.

All surfaces should be given two coats of Dixon's Silica-Graphite Paint; the second to be applied after the first is thoroughly dry.

No adulterating oils or thinners should be used, as Dixon's Paints are properly compounded with the correct amounts of pigment, vehicle, driers, etc., at the factory.

Realize that material on any painting job is only half as much as the labor cost. This labor cost is the same, whether good paint or cheap paint is applied. The difference is that, when you "save" by buying cheap paints, you foot an extra labor bill long before it would be due if Dixon's is applied.

Write for Color Card and Booklet No. 231-B.

JOSEPH DIXON CRUCIBLE COMPANY

JERSEY CITY — NEW JERSEY

ESTABLISHED 1827

DIXON'S SILICA GRAPHITE PAINT

ADEQUATE PROTECTION AT MINIMUM ULTIMATE COST

Buyers' Reference Index

See page 123 for advertisements of these products

Bell
Donaldson Iron Co.
Cast Iron
James B. Clow & Sons
Donaldson Iron Co.
McWane Cast Iron Pipe Co.
Copper Service
Mueller Co.
Flange
Donaldson Iron Co.
U. S. Cast Iron Pipe & Fdy. Co.
Spigot
Donaldson Iron Co.
Steel
Pittsburgh Steel Products Co.
Smith Corpn., A. O.
Welded Steel
The Stacey Mfg. Co.
Semet-Solvay Engineering Corp.

PIPING (High Pressure)
M. W. Kellogg Co.

PIPE COATINGS
Wailes Dove-Hermiston Corp.

PRESSURE HOLDERS
The Stacey Bros. Gas Const. Co.

PLATES
Floor
Cruse-Kemper Co.
Gas Engineering Co.
Riter-Conley Co.
Russell Engineering Co.
The Stacey Mfg. Co.

PLUGS SERVICE AND MAIN
Rubber
Soft Wood
The C. M. Kemp Mfg. Co.
Soft Wood
The Safety Gas Main Stopper Co.

PRODUCER GAS PLANT
Gas Engineering Co.
The Gas Machinery Co.
The Koppers Construction Co.
Riter-Conley Co.
Semet Solvay Engineering Corp.
The Stacey Mfg. Co.
The U. G. I. Contracting Co.
Western Gas Construction Co.

PROVERS—METER
American Meter Co.
Helme & McIlhenny
Lambert Meter Co.
D. McDonald & Co.
Pittsburgh Equitable Meter Co.
Superior Meter Co.

PUMPS
Lambert Meter Co.
P. H. & F. M. Roots Co.
Superior Meter Co.
Drip
The Connersville Blower Co.
D. McDonald & Co.
Mueller Co.
George D. Roper Corp.
Gas Bag
The Safety Gas Main Stopper Co.
Hand
George D. Roper Corp.
Oil
The Connersville Blower Co.
D. McDonald & Co.
George D. Roper Corp.
Semet Solvay Engineering Corp.
Power
George D. Roper Corp.
Pressure
D. McDonald & Co.
Service
The Safety Gas Main Stopper Co.
Service Cleaner
Mueller Co.
Tar
The Connersville Blower Co.
D. McDonald & Co.
George D. Roper Corp.
P. H. & F. M. Roots Co.
Semet Solvay Engineering Corp.
Vacuum
D. McDonald & Co.
P. H. & F. M. Roots Co.
Water
George D. Roper Corp.

PURIFIERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Co.
The Koppers Construction Co.
Riter-Conley Co.
Semet Solvay Engineering Corp.
The Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
The U. G. I. Contracting Co.
Western Gas Construction Co.

PURIFYING MATERIALS
Alpha-Lux Company, Inc.
Connelly Iron Sponge & Gov. Co.
Cruse-Kemper Co.
Gas Purifying Materials Co., Inc
Lavino, E. J., & Co.

PURIFIER TRAYS
Bartlett-Hayward Co.
Cruse-Kemper Co.
The Gas Machinery Co.
Semet Solvay Engineering Corp.
The Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
The U. G. I. Contracting Co.

PYROMETERS
Indicating
Recording
The Bristol Co.
Taylor Instrument Companies
Optical
Radiation
Pyrometer Instrument Co.

RADIATORS
Gas Steam
Gas Water
James B. Clow & Sons

RANGES—GAS
American Stove Co.
Electric Porcelain & Mfg. Co.
Geo. D. Roper Corp.

REAMERS
Pipe End
Mueller Co.

REFRACTORY CEMENTS
Botfield Refractories Co.
Quigley Furnace Spec. Co., Inc.

REFRACTORY GUN
Botfield Refractories Co.
Quigley Furnace Spec. Co., Inc.

REFRACTORY LININGS
Alpha-Lux Company, Inc.
Botfield Refractories Co.
The Gas Machinery Co.
The Jersey City Refractories Co. Inc.
E. J. Lavino & Co.
Russell Engineering Co.
Quigley Furnace Spec. Co., Inc.
Semet Solvay Engineering Corp.
The U. G. I. Contracting Co.
Walsh Fire-Clay Products Co.

REGULATORS
Am. Schaeffer & Budenberg Corp.
American Stove Co.
The Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Gov. Co.
Isbell-Porter Co.
Groble Gas Regulator Co.
Minneapolis Heat Regulator Co.
Mueller Co.
Pittsburgh Equitable Meter Co.
Reynolds Gas Regulator Co.
Robertshaw Thermostat Co.
P. H. & F. M. Roots Co.
Semet Solvay Engineering Corp.
Smoot Engineering Corp.
The Sprague Meter Co.
Taylor Instrument Companies
The Wilcolator Co.

RETORT CEMENT
Alpha-Lux Company, Inc.
Botfield Refractories Co.
The Improved Equipment Co.
The Jersey City Refractories Co. Inc.
E. J. Lavino & Co.
Quigley Furnace Specialties Co., Inc.
Russell Engineering Co.

RETORTS
The Jersey City Refractories Co., Inc.
E. J. Lavino & Co.
Riter-Conley Co.
Walsh Fire-Clay Products Co.
Horizontal and Inclined
Silica and Clay
The Gas Machinery Co.
The Improved Equipment Co.
Russell Engineering Co.
Walsh Fire-Clay Products Co.
Silica and Clay
The Gas Machinery Co.
The Improved Equipment Co.
The Jersey City Refractories Co. Inc.
Russell Engineering Co.
Vertical
The U. G. I. Contracting Co.
West Gas Improvement Co.

RUBBER RINGS
Southwestern Pipe Joint & Engineering Co.

SAFES
Cabinet and File
Remington Rand Business Service, Inc.

SCALES
C. W. Hunt Co., Inc.

SCRUBBERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Co.
The Koppers Construction Co.
Riter-Conley Co.
Semet Solvay Engineering Corp.
The Stacey Bros. Gas Constr. Co.
The Stacey Mfg. Co.
The U. G. I. Contracting Co.
Western Gas Construction Co.

SERVICE BOXES
Mueller Co.

SERVICE PLUG—RUBBER
The Safety Gas Main Stopper Co.

SKIP HOISTS
C. W. Hunt Co., Inc.

SPONGE
Alpha-Lux Company, Inc.
Connelly Iron Sponge & Gov. Co.
Gas Purifying Materials Co., Inc.
Lavino, E. J., & Co.

STATION METERS
American Meter Co.
The Connersville Blower Co.
The Gas Machinery Co.
Maryland Meter Works
D. McDonald & Co.
Metric Metal Works
Pittsburgh Equitable Meter Co.
P. H. & F. M. Roots Co.

STATIONERY—LITHOGRAPH
Remington Rand Business Service, Inc.

STEAM ACCUMULATORS
The Gas Machinery Co.
Semet Solvay Engineering Corp.
Smoot Engineering Corp.
The U. G. I. Contracting Co.

STOPPERS
The Safety Gas Main Stopper Co.

STREET DEPT. EQUIPMENT
The Safety Gas Main Stopper Co.

STOVES—GAS
Electric Porcelain & Mfg. Co.
Geo. D. Roper Corp.

STREET LAMPS
General Gas Light Co.
Kitson Co.
Welsbach Street Lighting Co. of America

SYSTEMS
Combustion Control
The C. M. Kemp Mfg. Co.
Smoot Engineering Corp.
Hot Water Heat Control
Mueller Co.

TACHOMETERS
Bristol Co., The
Precision Ther. & Inst. Co.

TANKS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
Riter-Conley Co.
Pittsburg Water Heater Co.
Semet Solvay Engineering Corp.
The Stacey Bros. Gas Constr. Co.
The Stacey Mfg. Co.
Western Gas Construction Co.
High Pressure
The Stacey Mfg. Co.

TANK REGULATORS
Am. Schaeffer & Budenberg Corp.

TAPE, SOAP—BINDING
The Safety Gas Main Stopper Co.

TAPPING MACHINES
Mueller Co.

TAR DISPLACEMENT SYSTEM
Semet-Solvay Engineering Corp.
Western Gas Construction Co.

TAR DISTILLING PLANTS
Carl Still, Incorporated.
Gas Engineering Co.
The Gas Machinery Co.
Riter-Conley Co.
Semet-Solvay Engineering Corp.
The Stacey Bros. Gas Const. Co.

TAR EXTRACTORS
Bartlett-Hayward Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Co.
The Koppers Construction Co.
Semet Solvay Engineering Corp.
The Stacey Mfg. Co.
The U. G. I. Contracting Co.
Western Gas Construction Co.

TEMPERATURE CONTROLLING DEVICE
Am. Schaeffer & Budenberg Corp.
American Stove Co.
The Bristol Co.
Robertshaw Thermostat Co.
Taylor Instrument Cos.
The Wilcolator Co.

THERMOSTATS
The Bristol Co.
Robertshaw Thermostat Co.
Taylor Instrument Cos.
The Wilcolator Co.

THERMOMETERS
Am. Schaeffer & Budenberg Corp.
American Meter Co.
The Bristol Co.
Cooper Oven Thermometer Co.
Lambert Meter Co.
D. McDonald & Co.
Metric Metal Works
Precision Ther. & Inst. Co.
Semet Solvay Engineering Corp.
Superior Meter Co.
Taylor Instrument Companies

TOOLS
Caulking
Mueller Co.

TOOLS, PIPE GANG
The Safety Gas Main Stopper Co.

TRAPS—STEAM
Am. Schaeffer & Budenberg Corp.

TRENCH DIGGERS—
Austin Machinery Co.
Cleveland Trencher Co.
Geo. Haiss Mfg. Co., Inc.

TUBES, BOILER
National Tube Co.
Pittsburgh Steel Products Co.

TUBES, STEEL
Pittsburgh Steel Products Co.

TYPEWRITERS
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U GAUGES
Am. Schaeffer & Budenberg Corp.

VACUUM GAUGES
Bristol Co., The
Precision Ther. & Inst. Co.

VALVES
Am. Schaeffer & Budenberg Corp.
Bartlett-Hayward Co.
The Bristol Co.
James B. Clow & Sons
The Gas Machinery Co.
Isbell-Porter Co.
The Ludlow Valve Mfg. Co.
Metric Metal Works
Mueller Co.
Semet Solvay Engineering Corp.
The Stacey Mfg. Co.
Taylor Instrument Cos.
The U. G. I. Contracting Co.
Western Gas Construction Co.

VALVES—COAL AND ASH VALVES
C. W. Hunt Co., Inc.

VISIBLE RECORD EQUIPMENT
Remington Rand Business Service, Inc.

WASTE HEAT BOILERS
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The Gas Machinery Co.
Russell Engineering Co.
Semet Solvay Engineering Corp.
The U. G. I. Contracting Co.
West Gas Improvement Co.
Western Gas Construction Co.

WATER GAS APPARATUS
Bartlett-Hayward Co.
The Gas Machinery Co.
Isbell-Porter Co.
Semet Solvay Engineering Corp.
The Stacey Mfg. Co.
The U. G. I. Contracting Co.
Western Gas Construction Co.

WATER GAS GENERATORS
Semet-Solvay Engineering Corp.
Western Gas Const. Co.

WATER HEATERS
Electric Porcelain & Mfg. Co.
James B. Clow & Sons
Humphrey Co.
Welsbach Co.

WEIGH LARRIES
C. W. Hunt Co., Inc.

YARN, CAULKING
The Safety Gas Main Stopper Co.

METERING THE HOUSE HEATER

Domestic heating by gas has come to stay. No longer is it in the experimental or uncertain stages which have marked it for some years. It has now become an active factor in the progressive gas company's annual load.

Metering the gas consumed by various types of heaters presents a new problem. The gas company is primarily interested in the accurate registration of gas consumed over a long period of satisfactory service. The consumer is interested in the amount of gas which he will consume and is inclined to judge this amount by the size of the meter installed. As a solution to this problem, the 30-A meter has proved itself ideal. With a capacity of 875 cu. ft. per hour (½ inch differential) it will safely accommodate all normal heating loads through peak ranges whether natural or manufactured gas is used.

An added feature in this meter is the compactness with which it is built. Small overall dimensions render it in no way cumbersome or bulky. Its performance in the past has proved its worth and in appearance it forms a creditable adjunct to the home heater of the present day.

30-A Meter Specifications

Capacity with ½ in. drop in pressure	875 cu. ft.	Approximate shipping weight	83 lbs.
Threaded connection for iron pipe	1¼ in.	Overall height	24⅞ in.
Plain connection for lead pipe	1½ in.	Width to outside of caps	21 in.
Net Weight	46 lbs.	Width to outside of screws	20 7/16 in.
		Greatest depth	15¾ in.

Helme & McIlhenny have been actively engaged in the manufacture of high grade gas meters since 1848. Their present production includes meters in all sizes with capacities ranging from 150 to 3,400 cubic feet per hour. These meters are of both the "A" and "B" types and involve all refinements and developments which have been progressively introduced in the construction of tin gas meters.

HELME & McILHENNY

of American Meter, Inc.

ESTABLISHED 1848

17th and Clearfield Streets

Philadelphia, Pa.

MARYLAND METER WORKS

OF

AMERICAN METER COMPANY

INCORPORATED

BALTIMORE MARYLAND

MARYLAND "C" TYPE METERS

Double the Hourly Capacity, with Slow Speed Operation

Increased Capacity.
Decreased Installation Cost.
Decreased Maintenance Cost.

Decreased cost for service connections per cubic foot capacity on completed installation.

Showing:
Enlarged valves with special guides; Compound levers for double diaphragms.

Showing:
Double diaphragms with equalizers.

The "C" METER is a NEW development in the larger sizes of THE MARYLAND "B" METER, with Tin Case and retaining the established principle for Positive Displacement Measurement in the two-diaphragm, slide-valve method of Operation.

THE MARYLAND "B" TYPE GAS METERS
THE MARYLAND "C" TYPE GAS METERS

Southern Representative
J. E. Montgomery, 1500 South Tenth Ave., Birmingham, Alabama

ALPHABETICAL LIST OF ADVERTISERS

A. B. Stove Co..... 99
Akme Flue, Inc..... 110
Alpha Lux Co..... 108
American Cast Iron Pipe Co..... 113
American Gas Products Corp..... 77
American Lava Corp..... 106
American Meter Co..... 56
American Schaeffer and Budenberg Corp..... 96
American Stove Co..... 85
Austin Machinery Corp..... 101

Bartlett Hayward Co..... 22
Boone County Coal Corp..... 67-68
Botfield Refractories Co..... 19
Bristol Co., The..... 100
Byllesby Engineering & Management Corp.... 108

Cast Iron Pipe Research Assn..... 111
Chaplin-Fulton Mfg. Co..... 100
Cleveland Trencher Co., The..... 103
Clow & Sons, James B..... 79
Connelly Iron Sponge & Governor Co..... 115
Connersville Blower Co..... 11
Cooper Oven Thermometer Co., The..... 104
Cruse-Kemper Co..... 58

Dixon Crucible Co..... 119
Dresser, S. R., Mfg. Co..... 21
Dry Quenching Equipment Corp..... 8

Electric Porcelain & Mfg. Co..... 108

Gas Engineering Co..... 115
Gas Machinery Co..... 7
Gas Purifying Materials Co..... 114
General Coal Co.....Front Cover
General Gas Light Co..... 86
Groble Gas Regulator Co..... 108

Haiss Manufacturing Co., Inc., Geo..... 112
Helme & McIlhenny..... 121
Home Incinerator Co..... 102
Homestead Heater Co..... 93
Humphrey Company..... 81
Hunt, C. W., Co..... 114

Improved Equipment Co..... 15
Isbell-Porter Co..... 112

Jersey City Refractories Co..... 112

Kellogg Co., Inc., M. W..... 98
Kemp Mfg. Co..... 94
Kernit Incinerator Co..... 89
Kitson Company..... 117
Kompak Company..... 87
Koppers Co..... 2

Lambert Meter Co..... 110
Lamneck Co., The W. E..... 106
Lavino & Co., E. J..... 106
Ludlow Valve Co..... 110

Maryland Meter Works..... 122
McDonald & Co., D..... 124
McWane Cast Iron Pipe Co..... 107
Metric Metal Works..... 57
Minneapolis Honeywell Regulator Co..... 75
Monarch Engineering Co..... 88
Mueller Company..... 90

National Tube Co..... 109

Pittsburgh Equitable Meter Co..... 16
Pittsburgh Steel Products Co..... 105
Precision Thermometer & Instrument Co..... 98
Pyrometer Instrument Co..... 20

Quigley Furnace Specialties Co..... 104

Reynolds Gas Regulator Co..... 12-13
Ridgway & Son Co., Craig..... 83
Riter-Conley Co..... 110
Robertshaw Thermostat Co..... 95
Roots Co., P. H. & F. M..... 18
Roper Corp., Geo. D..... 97
Russell Engineering Co..... 108

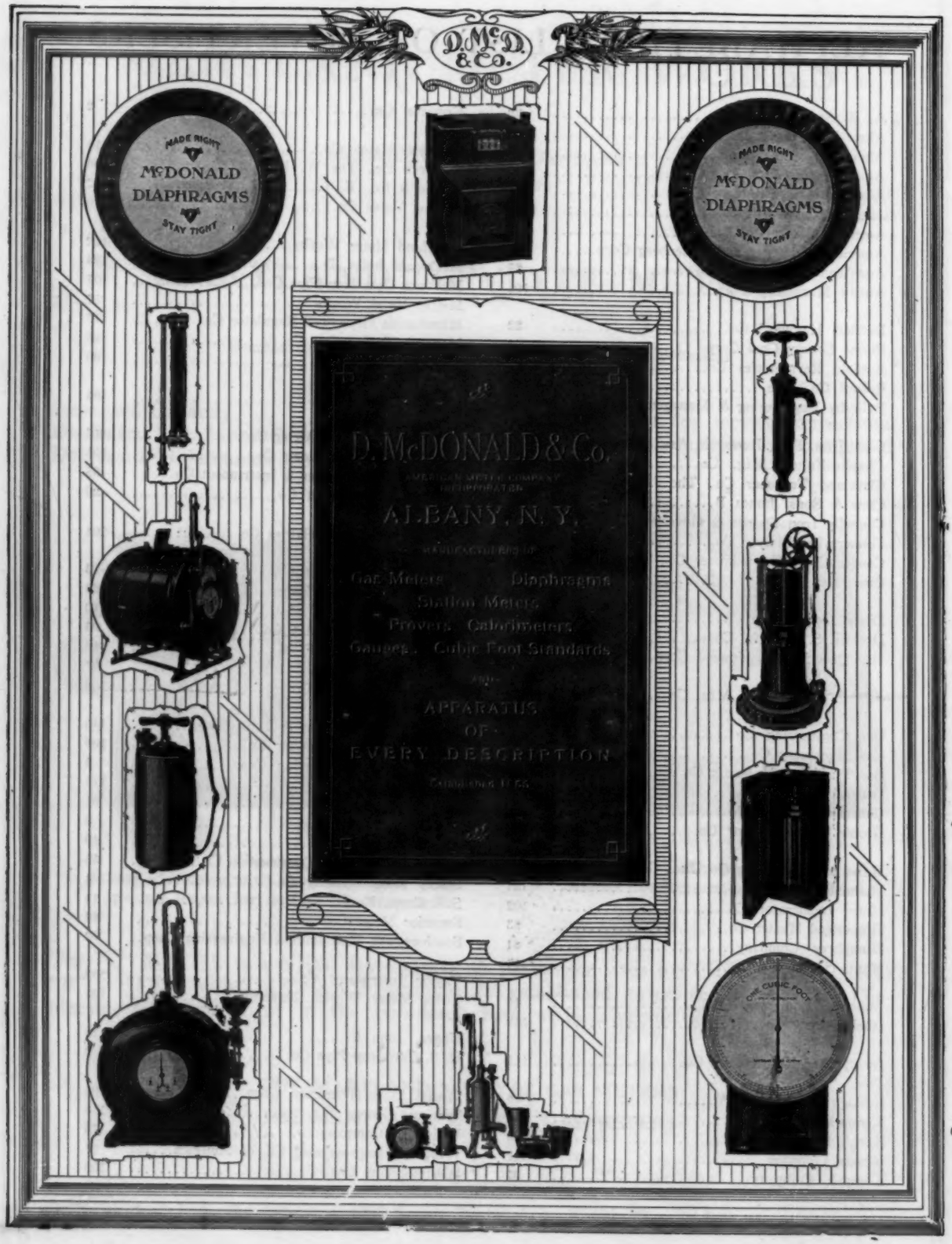
Safety Carboy Holder & Truck Corp..... 115
Safety Gas Main Stopper Co..... 106
Semet-Solvay Engineering Corp..... 5
Shelburne Hotel, The..... 115
Smith Corp., A. O..... 91
Smoot Engineering Co..... 6
Sprague Meter Co..... 10
Stacey Brothers Gas Construction Co..... 55
Stacey Manufacturing Co..... 4
Still Corp., Karl..... 14
Superior Meter Co..... 83
Southwestern Pipe Joint & Engineering Corp.. 92

Taylor Instrument Co..... 102
Tufts Meter Works, Nathaniel..... 125

Unger, John S..... 115
U. S. Cast Iron Pipe Co..... 9

Wailes Dove-Hermiston Corp..... 94
Waring, George H..... 115
Welsbach Company..... 73
West Gas Improvement Co. of America..... 17
Westmoreland Coal Co..... 106

BUYERS' REFERENCE INDEX, PAGES 116, 118, 120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MADE RIGHT
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D. McDONALD & Co.
ALBANY, N. Y.
Gas Meters
Diaphragms
Station Meters
Provers
Calorimeters
Gauges
Cubic Foot Standards
APPARATUS
OF
EVERY DESCRIPTION
ONE CUBIC FOOT

LOOKING BACKWARD 30 YEARS

The Use of Gas Has Increased 500% Since 1895

Notwithstanding the loss of a large percentage of gas lighting, the diversified use of gas for domestic and industrial purposes has very materially increased the sales per meter.

The peak demand load is constantly increasing and is of such a nature that volume, as well as pressure, is required for the best results.

From a study of the individual records of several hundred thousand meters, summarized according to the system of the

FOUR CARDINAL POINTS

it is very evident that meters with additional capacity for the volume required hold their proof far better and have a longer life than meters which are overloaded and overworked.

LOOKING AHEAD 30 YEARS

The Lifetime of Our Meters

We strongly urge the placing of meters of greater capacity and volume for domestic and industrial customers where surroundings and industry indicate a prospective increased use of gas.

Capacities at One-Half Inch Loss in Pressure

5-B Capacity	150 Cu. Ft. Per Hour	100-B Capacity	1,800 Cu. Ft. Per Hour
10-B Capacity	300 Cu. Ft. Per Hour	150-B Capacity	3,000 Cu. Ft. Per Hour
20-B Capacity	450 Cu. Ft. Per Hour	250-B Capacity	4,500 Cu. Ft. Per Hour
30-B Capacity	600 Cu. Ft. Per Hour	500-B Capacity	7,500 Cu. Ft. Per Hour
60-B Capacity	1,250 Cu. Ft. Per Hour		

20 Years Experience

With the B-Type Meter

1860 **68 Years in Boston** **1928**

Manufacturing the Glover Type Meters

NATHANIEL TUFTS METER WORKS

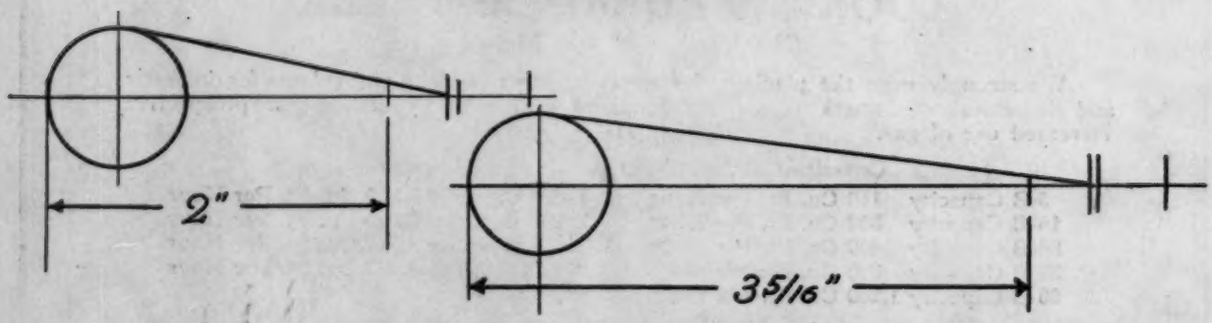
of

American Meter Company, Incorporated

455 Commercial Street

"A" METERS

23 YEARS RECORD



From 2 inches to $3\frac{5}{16}$ inches---a 60 per cent increase!

A 60% increase in the length of the valve arms of a gas meter means a considerable advance toward perfect uniformity in port openings for corresponding positions of the crank, and a much smoother movement of the meter in operation. This has been accomplished recently in the "A" meter.

The D-slide valve, used continuously in meter construction since 1858, was taken from steam engine design and the valve arm demonstrates a curious phenomenon known as the angularity of a connecting rod. Expressed in the language of the gas meter, this means that the longer the arm in proportion to the diameter of the crank circle (i.e., valve travel), the more equally the valves may be "divided."

The guaranteed minimum capacities are:

5-A	175	cubic feet per hour
10-A	375	" " " "
30-A	875	" " " "
60-A	1500	" " " "
150-A	3400	" " " "

The whole range of customers' demands are met by carrying only five sizes of meters in the stock room.

JOHN J. GRIFFIN & CO.

ESTABLISHED 1858

1513 Race Street, Philadelphia

559 West 47th Street — **New York City**